THE
ELECTRICAL REVIEW

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Electricity in the Home

The Immediate Future

DOMESTIC electrification is very largely a post-war (1914-18) development. Prior to 1914, with the exception of lighting, the general public were inclined to regard electrical appliances as more or less curiosities, or at the best interesting experiments. The new branch of electrical industry gained impetus from the need to find an outlet after the war for the energy available from plant installed primarily for industrial purposes.

Now we find ourselves with a well-developed domestic load and a call for even more industrial power. What will be the effect upon that domestic load? Already by a reduction of 25 per cent. in the allowed consumption of electricity in domestic and small commercial premises a considerable margin is made available to industry. Will it be possible to proceed with domestic electrification and still meet the expanding factory demand?

The greatest electrical enthusiast will be forced to admit that the rapid progress made in the domestic sphere cannot continue at the same rate. As Mr. V. W. Dale shows in his article in this issue, since 1918 the revenue of the supply industry has risen from £14,000,000 to a figure approaching £100,000,000, while the number of consumers has increased from 600,000 to something over 9,000,000. A very substantial proportion of this is attributable to domestic development. The Electricity Commissioners' last returns (1937-38) put the consumption for lighting, heating and cooking at 38.1 per cent. of the total.

Economy and Control

But an admission that there must be a slackening in the rate of progress does not necessarily imply a "defeatist" frame of mind. It is absurd to think that a business of such a magnitude is to come to a stop and wither away because of the existence of a state of war. There are some very powerful reasons for maintaining and improving the position of electricity in the home in wartime. In the first place it has always been a major claim for electricity that it is economical. With economy enforced by the present circumstances, this is an even more cogent argument for the preservation or extension of the domestic load.

Electricity is easily controlled and can be applied just where it is needed—advantages which our nearest rival possesses to a limited degree and which are not possessed at all by raw fuel. The wastefulness of the domestic hearth has been so often stressed that it is necessary only to mention the fact. Here at least is scope for extension. With rationed coal it will not be possible to keep a fire alight from early morning until night. A coal fire takes a long time to make itself felt after being lighted; there is much waste in the initial stage. An electric fire starts its useful work immediately it is switched on, and the switches can be operated at need to keep a room at the right temperature. Similar considerations apply in the case of cooking and water heating, where the whole of the heat is effectively used instead of a substantial proportion being sent up a chimney. It may therefore be a good move for a coal consumer to change over, for the equivalent amount of electricity allowed by the Fuel Order, 1,400 kWh for a ton of coal, if not too generous, could be employed to greater advantage.

Education Must Continue

To get the best out of electricity, however, it is essential that the housewife shall possess the easily-acquired "technique" of domestic electricity. It is in this direction that the saving necessitated by electricity rationing can be made. We feel that in the past a good many supply undertakings have not looked after this side of their business so attentively as they should have done. Now, of course, it will probably not be so easy. Nevertheless we heartily subscribe to Mr. Dale's view that "service" should still be a major consideration in the supply business, even if serious obstacles have to be surmounted. It is only by keeping in close touch with the consumer (a condition, by the way, which rationing enforces upon the supply authority) that the domestic load can be maintained or expanded. War conditions merely intensify that need.

A considerable measure of assistance to the consumer is afforded by the memoranda on rationing prepared by the E.D.A. and the E.A.W. Miss Caroline Haslett, the director of the latter Association, deals with the matter in her article on page 443 and outlines some of the principal points in the E.A.W. pamphlet. As a beginning, we suggest that all undertakings should see that their domestic consumers have one or other of these useful aids to

economy; the cost would be negligible in comparison with the value of the goodwill created.

Manufacturers are also doing their share, in spite of handicaps, to sustain and satisfy the domestic demand. Our reviews of the various classes of equipment available show that many attempts are being made to meet the new conditions, although, of course, the bulk of the equipment mentioned was designed before the present emergency arose.

There is a tendency for supply authorities to suspend their hire-purchase schemes, and no doubt the present situation, which involves many movements among the population, dictates such a course. We think, however, that instead of complete suspension regard might be paid to individual cases even if greater safeguards have to be introduced. Possibly electrical retailers will benefit from the supply authorities' decision, but however that may be we believe that domestic electrical equipment will still be in demand and somebody will have to supply it.

Notifying Supply Failures

SOME relaxation is allowed, starting from the beginning of this month, of the official requirements regarding notices of failures of supply under the Electricity Supply Regulations, 1937. The Electricity Commissioners need not be informed of all interruptions, even when they affect a whole undertaking or the bulk supplies it receives and gives. These have now to be reported only when they last for an hour or more. The period for high-voltage supply failures that affect plant transforming or converting to the consumers' voltage, when its installed capacity is 1,000 kW and above, has been increased from one to two hours. Other high-voltage failures, provided they last for more than twelve hours, are reportable as before. The above revisions are made in the light of experience gained since the present rules came into force six months ago. Events since then have unhappily made it necessary to add a new item—that of any failure of supply of whatever duration due to damage to the works of an undertaking consequent upon hostile attack. It is earnestly to be hoped that the occasions for such reports may be few and far between, but immunity from air raids up to the present cannot be taken to imply that precautions can safely be modified.

Change-over Problems

STANDARDISATION of system or frequency is as much in the ultimate interests of consumers as it is of supply undertakings. It probably brings no immediate benefits in individual instances, however, and the Electricity Commissioners require, broadly speaking, that consumers shall be no worse off as a result. A correspondent this week raises questions regarding the procedure adopted by an undertaking in changing over a consumer from DC to AC. The authority would appear to be acting within its powers in installing a rectifier to supply the existing DC motors rather than going to the expense of installing new AC motors, control gear and cables. More doubtful is the requirement that the consumer shall install AC machines when existing motors have to be replaced by others of approximately the same horse-power, if this means the scrapping of DC starters and cables. As the rectifier would be installed to save the undertaking expenditure we do not see that free space can be demanded for it, unless supply is given under a special agreement the terms of which provide sufficient compensation. Otherwise the consumer in question is less well-off than others who have, moreover, received new AC motors. A further point is whether the undertaking can require additional motors to be AC. The consumer may have provided sufficient margin on his works DC distribution system for many more motors and he pays capital charges on the spare capacity, but presumably only the original installation can be taken into account. Our correspondent asks for our readers' opinions, and we should be pleased to hear from any whose experience may be helpful.

Readers are earnestly requested to instruct their local newsagents to reserve a copy of the ELECTRICAL REVIEW for them regularly in order to facilitate distribution arrangements and avoid the risk of failure to obtain copies.

In the interests of the paper itself in these difficult times it is particularly hoped that regular purchase will be made from the same newsagent or bookstall each week. To assist readers an order form is provided on page 476 of this issue.

New Generating Plant

THE Central Electricity Board has adopted, without modification, the North-West England and North Wales Electricity (Alteration and Extension) Scheme, 1939, details of which were published by us on July 21st. (Stationery Office, 1d.) This scheme relates to the selection of the existing Whitebirk station of Blackburn Corporation and the building of two new ones, one of which is required to meet the anticipated load in the Wirral Peninsula in 1942-43. The site of the other has not yet been settled, and no doubt the decision in this matter will depend to some extent upon considerations other than those of meeting the demand anticipated in its neighbourhood under normal conditions. The anonymous station might conceivably provide a way out of the Chester deadlock on which we commented last week.

Ubiquitous Flex

"Flex—bruised, frayed, kinked and perishing flex—is the worst link in the electrical chain," said Mr. H. R. Taunton in commenting on the new I.E.E. Regulations recently. A good example of the liberties that are taken with flex by the handyman comes from New Zealand. From a two-way adaptor plugged into the kitchen pendant lighting fitting a flexible lead was taken along the ceiling, through the doorway—in such a manner that the door could damage the flex—to a point over the washing-up bench. Here another two-way adaptor was fitted, one outlet being used for a lamp and the other for a washing machine which was not earthed. In places the flex was stapled to the wall. In the Dominion, unlike in this country, the electrical handyman has to contend with the law, and in this case the offender was prosecuted and fined £3 with £1 11s. costs—more than enough to have paid for the work to be carried out by a qualified wireman.

A False Impression

AN interesting point was raised by a correspondent in our last issue and *The Times* also published a letter on the same subject last week. We refer to the complaint that while consumers are restricted to three-quarters of their former consumption their fixed charges are apparently to remain unaltered. Therefore, it is argued, the supply authorities welcome rationing because they are going to secure a higher price per unit from two-part tariff consumers. Like many other apparently obvious matters this is one which is not altogether what it seems at first glance. It is true that the consumers will actually pay a higher price per unit but their expenditure will be less. The supply authorities will not benefit. They will lose revenue while having to keep their plant running as usual, and their fixed charges in keeping that plant available for service will not be any lower. Thus neither party is getting the better of the other; they are both victims of the abnormal circumstances which now exist.

CARRYING ON

How to Preserve the Domestic Load in Wartime

By V. W. Dale

IT must be a matter of extreme satisfaction to many of the workers in this industry to know that in the years that have passed since the 1914-18 war, electricity supply in Great Britain has made a very striking contribution to the victory of an all-too-short-lived peace. Twenty years of patient and continuous application, of courageous commercial policies, and of strenuous work in every branch, have brought about that unparalleled acceleration we have witnessed and which, but for the calamity that has now descended upon Europe, promised an era of prosperity, assured almost by its own momentum and doubly assured by the enthusiasm and skill of the industry's personnel as it stood and as we shall remember it at the beginning of September, '39.

Pessimists who think that domestic electrification is to come to a standstill are confuted by the author who shows that service is even more essential than ever

Statistics are unlikely to be popular at this time but it is perhaps worth while, as a brief preliminary, to cast an eye over the bare framework of electricity's great contribution to the service of mankind and to the monument it has created for itself in the process of establishing and carrying out that service. It is well that the achievements of this generation should not be forgotten when the history of our contribution to reconstruction after the last war comes to be written—certainly that contribution will provide a chapter worthy of a country that cradled within its boundaries most of the world's pioneers of electrical science.

Mr. V. W. Dale

For example: an industry which at the end of 1918 earned a modest revenue of £14,000,000 with no more than 600,000 consumers connected, was able just before the present conflict to see on the horizon a rapidly approaching revenue of £100,000,000 and 10,000,000 consumers. Plant capacity had increased some 600 per cent. and units sold by nearly 800 per cent. In the same period tremendous economies had been effected in generation and fuel consumption, and a vast national transmission system completed. Comparatively recent developments in domestic cooking and water heating had already achieved "saturation" figures of 15 per cent. and 8 per cent. respectively, while the popularity of wash boilers and larger domestic appliances generally was such that under normal conditions (while admittedly a few "problems" still remained) little real apprehension could have been felt about the industry's ultimate salvation as is shown at a glance in the accompanying pillargraph touching only a part of one branch of our development work.

The popularity of the score or more of small domestic appliances with which we are familiar is readily gauged by reference to only two of them—to the 6,000,000 irons and nearly 2,000,000 clocks at present in almost indispensable daily use in as many British homes.

But this is not a time for lengthy retrospect. In all conscience it is certainly a case of "new days, new ways"—unfortunately not in the happy sense that some of us have frequently been inspired to express that thought.

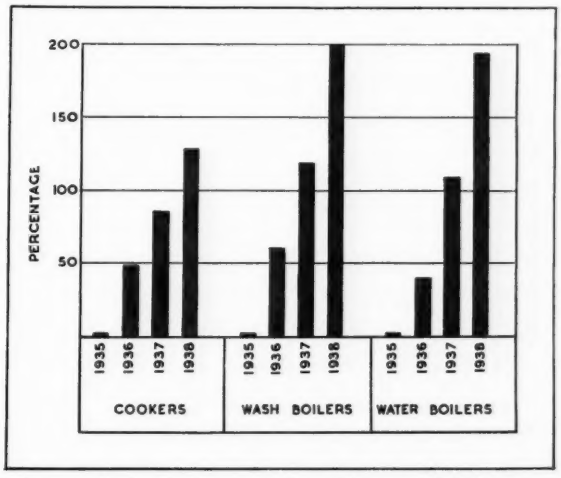
The difficulties which the commercial side of the industry now has to face are admittedly acute—they will be faced with fortitude—it is to be hoped, too, that, subject always to considerations of national importance, they will be faced by "authority" with due respect for the structure we have laboriously built up in the last half century, and particularly in the last twenty years; with regard, too, to the preservation of that essential spirit of constructive industry with which we can proudly say electrical people have overwhelmingly proved themselves to be exceptionally imbued; and to the ultimate destiny of a vital public service which will, without question, be of ever-expanding usefulness to mankind long after the tumult and the shouting dies and the little destructive systems of this generation give place to a new and better order.

In the meantime, the first urgent job of work on the commercial side seems to be to exert ourselves to the utmost to teach the public how to get a quart out of a pint-and-a-half pot, or to express it in terms of the Fuel Order—one hundred per cent. out of seventy-five. As things stand at present, people with vision will see in it a simple duty—even a simple duty of definite national importance—those without vision don't much matter at a time when realities are forced upon us. Certainly our object will not be achieved by panic or by the cessation of normal activity. Authority does not ask for that, neither does it wish for it. Electricity supply can, if it will, immediately adapt a great deal of its general routine and commercial machinery to fit the conditions in which we now find ourselves.

It was very encouraging recently to see in the West of England the words "Electricity Service Centre" inscribed on the facias of a large number of electrical showrooms, since this title was first introduced by the writer in a paper at an E.D.A. Sales Conference several years ago. If in peace time enterprising undertakers were able to satisfy themselves that the idea of *service* in the showroom was of paramount importance, how much more vital it is in these new days. So far from closing down showroom work, let us make up our minds that the number of Service Centres which this industry possesses at present is an irreducible minimum. Consistent with, and always adapting ourselves to, national circumstances, it is seriously submitted that we should endeavour to find or invent ways and means of continuing the functions of those Centres to the last ditch. The present needs of our consumers and, more important, the ultimate interests of the industry by which, and for which, many of us have lived for long past, can thus best be served.

Fortunately, there is already considerable evidence of a determination on the part of many of the managements of electricity supply undertakings, and, indeed, also many manufacturers, to do their utmost to "get on with the business." At this stage, at all events, the Dismal Jemmies are conspicuously absent, as we might expect and for which we are all thankful. This does not mean that we should be so foolish as to expect "Business as Usual" conditions—the acceptance of such an unimaginative slogan as a policy might in a short time be almost as disastrous as panic or cessation.

Planning for the new conditions which surround us, it is submitted, means establishing *service* and leaving selling more



Pillargraph showing increase in cookers, wash-boilers and water heaters expressed as a percentage over the number installed in 1935

or less to look after itself. It is, of course, a very fine distinction, because we must have sales in order to maintain our revenues as far as may be, to keep our factories busy and our people employed, and, incidentally, to help to pay for the war. Nevertheless, sales through *service* should guide us in planning and be our main objective. We shall doubtless require time and experience before we can formulate a long-term

policy, but without hesitation it occurs to me that the showroom is the first place that can be immediately adapted to wartime demands and conditions.

Labour saving will be an increasingly difficult problem in a great many homes. With shortage of domestic help, and with housewives for one reason or another finding their time more fully occupied than ever before, there will certainly be a case for showroom concentration on such useful time and work-saving appliances as clothes-washing machines and vacuum cleaners, especially in view of the fact that these things will make a very trifling demand on the 75 per cent. ration. Sale of energy for such appliances, even in the aggregate, will be almost infinitesimal: as expressions of electrical service their psychological value to the industry is infinite.

Wartime food problems can very surely be eased in many households with the aid of a refrigerator—of which presumably there are fairly good stocks in the country. Persistent demonstration in this direction offers the electricity showroom an opportunity to contribute very practically, if indirectly, to national welfare. As a result of such service, refrigerator sales this winter should be of exceptional dimensions.

Heating Considerations

Electric heating at this time offers the public the most efficient and economical available means of ensuring comfort and health, but it means stressing day in and day out intelligent *local* use. Somehow or other we have got to get it into the heads of our consumers that electric fires are as portable as fountain pens, and for reasons of necessary economy should be used in much the same way, that is to say, *where* wanted and only *when* wanted. Rationing demands the exercise of no greater economy. The virtue of the portable electric fire is almost unique in this respect and the necessity of fuel conservation compels us to get back to the story we had to tell twenty years ago when some of us were obliged to sell electric heating with high-priced units and give satisfaction at the same time. Unless we talk and demonstrate and establish the merits of *local* electric heating it is not unlikely that the public will sooner or later find themselves hopelessly confused by misleading thermal arguments which will do the gravest harm to the industry, both now and later.

At this point, because the heating consideration rather leads us to it, there are various advisory services which showrooms can render to perplexed consumers. By the time these notes appear, eleven million consumers in this country should know exactly where they stand as regards fuel rations.

If, in spite of, or as a result of, all the efforts we and others are making, one consumer in three has by this time succeeded in transforming himself into a combined thermostat and meter reader, we shall be most fortunate. The film people long ago discovered that it was necessary to fix the average age of intelligence for the screen at about 14½ years. Make no mistake—for a long time to come a great many of our consumers whom we have fought to get and whose friendly relations we wish, for the ultimate good of the industry, to retain, can be classified as a "perplexed public." It will need all the service we can give them to enable them to keep within the law and at the same time to continue to experience some of the joys of electric living. Lessons in reading meter dials should be a feature of every wartime cookery demonstration —indeed, it might very reasonably be a continuous service feature in every main showroom.

The nation, in its wisdom or otherwise, has at present set consumption of electricity broadly at three-quarters of normal. One ventures to say that, if needs be, by efficient and economical and intelligent use of apparatus the consumer must at least be shown how to retain more than three-quarters of the comfort and help to which he has become accustomed. Some of the ways in which we can thus help the consumer are set out briefly hereunder. All of these functions, it is imagined, can be carried out at and from the showroom or Service Centre, while as time goes by doubtless ways and means will be found for supplementing the information in the Press and through other channels of national publicity which will be found to be practicable in wartime.

Lighting and Cooking

Black-outs remain the order of the night out of doors—not indoors. Encourage economy by cutting down waste—by switching off light when it is not wanted, by earlier retiring if necessary, but *not* by cutting down wattage drastically in the living room and at any position *where* and *when* light is wanted for safety, utility, or even for its psychological values. There is no reason, at present anyhow, why the consumer in his own home should condemn himself to a winter of gloom. Few consumers really know how trifling is the consumption of electrical energy for a good and cheerful light—*when* it is wanted—and the few pence a month it costs to maintain it. The bogey that "electric light is dear" still exists just under the surface of a good many minds. Through planned and organised service we want to assure ourselves that our consumers are being guided by facts and not by delusions.

How much there is to be done in this direction in wartime. The supply demonstrator will need to keep a close eye on the changing and seasonal character of available foodstuffs; from time to time she will also have to advise on up-to-date wartime recipes which can be cooked with economical use of electricity. And, more important than ever will it be to teach the consumer how to use the cooker. We know too well that with units at two or three a penny and in unlimited quantity waste is often permitted by careless folk, and that a great disservice is constantly being done to electric cooking by unintelligent use of the cooker. All the established practices of economical operation are too well-known to need repetition here—suffice it to say that a determined effort must now be made to get these practices firmly into the heads and grafted into the habits of cooks and housewives. Certainly in the majority of homes there should be no insurmountable difficulty in saving the 25 per cent. on the cooker without undue resultant hardship and inconvenience. In many households the introduction of a smaller cooker than the existing one—for wartime at all events—will often provide a solution, and both the supplier and manufacturer will do well to think in terms of users' average daily requirements rather than those which obtain once a year on the morning of December 25th.

Again—perhaps a more tangible form of service—more than ever is it necessary that the undertaking should be ready to ensure at all times continuity and reliability of consumers' apparatus. And for goodness' sake don't let us all—all over the country—despair of the future of electric cooking if returned cookers pile up temporarily in evacuated areas. Let us remember that it is a matter of ratio, and that *electric* cookers are not the only domestic appliances temporarily out of commission.

Our smaller troubles must be absorbed with the larger ones, and although it is little consolation to affected undertakings the writer feels certain that they will bear with their temporary difficulties for the sake of preserving the cooker business from permanent damage.

Water Heating and Small Appliances

Here again we must teach the consumer to revise his ideas—or, in some cases, his apparatus. The accustomed comforts—in a slightly lesser degree; the accustomed standards of personal and domestic hygiene—but with a more sparing use of hot water.

As regards small appliances, it must be understood that many people are so woefully ignorant as regards running costs that it would not be at all surprising to learn that some had considered it necessary to forgo the use of their vacuum cleaners or even their electric clocks. Elementary educational and service work in the showrooms, planned and carried through ceaselessly and tirelessly, will do a great deal to avoid or minimise such absurdities.

Before the war, electricity had thoroughly established itself as Public Servant No. 1 for millions of men and women in this country; it will be so again *after* the war, and so far as we can see at present there is no reason why it should not occupy that place *during* the war. The extent to which the public will continue with a ready response to recognise in electricity a good and faithful servant depends to a very great degree upon the custodians of our supply undertakings: from all the signs and portents there is little, if anything, to fear.

And, by such a policy, when the light returns to this distracted planet, the electrical industry will be found equipped and ready with the least loss of time to contribute again its full share to recreating a new Britain.

A Restrictive Scheme

According to *Electrical Merchandising* (New York) the Rural Electrification Administration, discouraged by the fact that tenant farmers and other low-income ruralites are unable to afford electric service, propose a remedy for this situation. The R.E.A. will provide a limited service to these farmers through the development of a low-cost, low-capacity transformer. The farm to be wired under this new plan will be limited to 600 W. The R.E.A. is optimistic about the acceptance of this proposition, since it is understood to be placing an order for 10,000 units and expects to buy some 50,000 during the next eighteen months.

Our contemporary says:—"It all sounds like a poor piece of planning. The electrical industry to-day is still struggling with the problem of inadequacy of wiring and service in old homes and is trying its best to get something approaching adequacy in new ones. In face of this, the Government sets out to equip farm homes with a service insufficient for even fairly good lighting. And, of course, many farmers now perfectly able to pay for proper service will adopt this cheap form of connection, and the whole beautiful dream of the benefits of electricity to the farmer, through Government assistance, goes 'blooey.'"

ECONOMIC SERVICE

Electricity Under the New Conditions

By Caroline Haslett

A NEW technique of living is emerging from the new emergency conditions. Complete outside darkness is the rule, but indoors a little extra forethought can make for that comfort which provides the essential foundation for our daily occupations. The day's work is now accomplished under a new set of conditions, to which it will take some time to become adjusted. It is even more necessary that our homes, in addition to providing adequate shelter, should be places of cheer, and it may quite well be that in our readjustments electricity will prove an even greater friend than ever.

Consumers are now called upon to do with three-quarters of their former supply. Miss Haslett shows how this can be managed with the minimum of inconvenience.

The Government Order rationing electricity to 75 per cent. of the normal consumption is in force and is applicable to consumers of over 200 units a year. The two special provisions are that prepayment consumers taking supplies for lighting are exempt and in the case of premises with no means of cooking otherwise than by electricity the minimum ration is increased to 1,000 units, provided the consumer applies for the increase to the local fuel overseer. Application may also be made for an increased ration by consumers affected by evacuation.

Householders are faced with the problem of having to observe the regulations, while wishing to make their homes as comfortable as possible in the present circumstances. Wartime measures do not indicate a sudden transition from luxury to acute discomfort, but how to economise to the best advantage is the difficulty confronting most people. Planned economy is the solution, but the average householder needs guidance in eliminating some factors and retaining those which are indispensable to domestic well-being. Most households have undergone a change; some members have been evacuated with their firms, others are engaged in National Service duties, so that the normal domestic routine is upset. Heating, lighting and cooking are needed at times of the day and week different from usual custom. The housewife's task in regulating such a household is indeed a bewildering one.

Miss Caroline Haslett, C.B.E., Comp.I.E.E., is Director of the Electrical Association for Women, and President of the Women's Engineering Society

E.A.W.'s Assistance

It was with these points in mind that the Electrical Association for Women, as an organisation concerned with women's interests, felt that its knowledge would be acceptable to those who are housekeeping under emergency conditions. A statement was immediately drawn up giving simple instruction on the reading of meters, the calculation of the amount of electricity consumed by different appliances in a given time, and suggestions for economy with regard to lighting, heating, cooking, washing, ironing, water heating, vacuum cleaning, refrigeration. Arising out of Press announcements in London and the Provinces there has been an enormous demand for this practical information by people faced with a problem to which they had hitherto given little attention. The statement is issued in leaflet form, price 1d. (1½d. post free).

Electricity is a proved aid to housekeeping in normal conditions, and in wartime a proper understanding of its uses and of the full functional capacity of each appliance will show that it is an invaluable domestic asset. The rationing of electricity is an added reason why the maximum benefit should be obtained from the electricity available. In adjusting household supplies and budgets some people may prefer to make changes and to take their full fuel ration in the form of electricity. As other forms of fuel are similarly rationed, it may be an unnecessary inconvenience to obtain it from several sources, but naturally circumstances will differ in individual households. While there may not be any actual economy of cost in this procedure there will certainly be economy of comfort. The discomfort of going to an outside coal-shed on a "blacked-out" winter's night would be avoided by the use of an electric fire and since living will be more compact for the sake of economy heating and lighting facilities not in use should be removed.

As each unit now consumed should be used to advantage, hints given in the E.A.W. leaflet are intended to be a guide to the value of a unit of electricity as related to each piece of apparatus. The average householder tends to overlook the significance of things which are of no immediate concern such as the exact light value of electric lamps and the exact amount of electricity consumed by fires of different loadings. Therefore, simple instructions are set out stating how long lamps of varying wattage will burn for one unit of electricity and how many units are used per hour by different fires. Householders can use this knowledge as a basis in assessing the distribution of their rationed allowance.

Economic and Efficient Lighting

Lighting is perhaps the chief general problem of the moment, but by carefully attending to the allocation and wattage of lamps, cheerfulness can still be obtained. It is suggested that the principal activities of the house should be concentrated in as few rooms as possible. The use of good quality pearl lamps is advocated as they give better results and have longer life. Where possible cream or amber coloured shades are advised. Although screened windows are compulsory, there is a degree of screening above the law's requirements which will result in full light value being obtained from the lamps installed. While care should be taken to avoid too striking a contrast between the light of the living room generally used and the dimness of other rooms and corridors, it is possible to light this selected room in such a way that cheerfulness is apparent and eyestrain is eliminated. Of course it all depends upon the distribution of light. The value of floor and table standards will be appreciated in placing light where it is needed. In redistributing light sources it may be worth while to have additional outlets installed. While it is suggested that lamps should be removed from rooms not in use, attention is drawn to the fact that light reduction should be effected in accordance with safety-first principles. For staircases, landings, narrow passages, &c., it is possible to obtain lamps which regulate the consumption from 4 to 25 W. They are also invaluable in nurseries and invalid rooms where a low continuously burning light is needed.

Room and Water Heating

As the winter draws on heating will become more important, and for economy in room heating it is suggested that only one bar of an electric fire should be used when possible; bowl fires are recommended for short periods or localised heating in rooms other than kitchens or bathrooms, on account of their portability and low consumption of electricity. In rooms where it is essential to have a large electric fire, the full heat may be turned on until the room is warm and the switch then turned down. The electricity supply authority should be consulted regarding the regulation of thermostats for tubular, panel or convector heating. Although the luxury of a bedroom fire may have to be dispensed with, the electric heating pad or blanket, of low consumption, will provide winter night comfort and do away with hot water bottles.

In water heating organisation of operations assists economy. Washing-up should be arranged to avoid incessant drawing-off of hot water and on no account should dishes or hands be washed under a running tap. It is important to heat only the amount of water required and the electric kettle should be used except when cooking is being done and space is available for a kettle or saucepan on a boiling plate already in use. As a guide in estimating consumption it is mentioned that a two- or three-pint kettle may be used for ½ to 1½ hours for one unit, depending on the loading of the kettle. It will not be necessary to economise in the number of baths if the amount of water used is considerably reduced; about 3 or 4 units are needed to heat water for one bath. It is suggested

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HOUSE WIRING

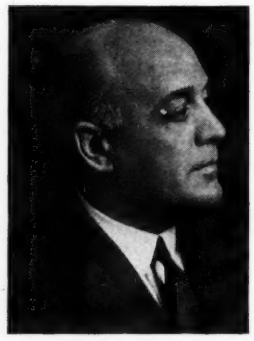
Which is the Best System?

By T. C. Gilbert, A.M.I.E.E.

Mr. Gilbert surveys the wiring methods now available from the aspects of reliability, cost and ease of extension, and plumps for the t.r.s. system

THE present unhappy international situation will undoubtedly be the cause of a considerable hold-up in the matter of erection of new buildings, especially in the direction of local rehousing schemes, large increases in which were generally projected for next year. On the other hand, any large migration of the public to other areas, generally electrically backward, must result in increased wiring activity in those districts, and the installation of electrical services to some of the older buildings. In addition, some increase in wiring for electric heaters, washing machines, and cookers may be expected in most districts, as soon as any difficulty in the transportation of raw coal becomes apparent; the switching-on of a small radiator for a short period will be kinder to the nation's fuel reserve than the lighting of a coal fire in a cold grate.

The reduction of the consumer's electricity demand by 25 per cent. need not discourage the installation of wiring for general purposes—in fact, the tendency seems to be towards the installation of wall sockets for the use of standard lamps and local lighting in place of the usual general lighting in living rooms, which has been found difficult to control under rigid black-out conditions. The reduction of the lamp wattages by this means, without any corresponding decrease in applied illumination, is automatically achieving the required decrease in current consumption, whilst the tendency to use a smaller number of rooms, under the same compelling factor, will result in a lessening of the amount of heating required.



[Elliott & Fry.
Mr. T. C. Gilbert

Wiring considerations remain, therefore, fundamentally as before, with perhaps an emphasis upon costs as compared with general excellence, and upon expediency as against the strict letter of the Regulations. Not that any factor regarding safety should be overlooked, or chances taken when already too many fire risks from outside action exist, but it is felt that some of the requirements regarding domestic diversity might with advantage be relaxed, in the general interest. In most cases, especially in the vexed matter of heating socket-outlets, some latitude is desirable in these days of rapidly rising wiring costs.

I would therefore place these considerations in the following order of importance: Cost, safety, flexibility, provision for extension, ease of maintenance (especially in the event of damage from external causes), and finally appearance. In normal times some of these requirements should be transposed, but in all cases I would place the first three in the same order. In the same way, the first demand will probably be for heating, as compared with lighting in more comfortable times, followed by cooking and water heating; provision will be required for washing machines, vacuum cleaners, clocks, radio, and other conveniences, whether already established or yet to be devised under the stress of modern conditions. Lighting, except for the socket-outlet extensions referred to above, will probably come at the end of the list.

Four Methods

Dealing first with the matter of cost, the usual wiring systems employed in domestic premises are four in number—heavy-gauge screwed-steel conduit, lead-covered wiring systems, light-gauge steel conduits with grip-continuity accessories, and tough-rubber-sheathed wiring systems. I am of the opinion that if a certain sum be allotted to the wiring of the building, usually about 2½ per cent. of the total cost, then this is better employed in securing the maximum possible service or number of outlets with, possibly, a not-quite-perfect wiring system, than in installing a limited service carried out in the approved "cast-iron" manner, which postulates a wiring system which will outlast many modern residential buildings.

Both on the score of cost and flexibility heavy-gauge screwed conduit systems are unsuitable for domestic premises. The

ECONOMIC SERVICE *(Continued from preceding page)*

that the use of the wash-boiler be minimised and the switch turned down as soon as boiling point is reached. A first general precaution in economising in water heating is to see that the lagging of the tank is adequate, minimising the loss of heat.

Useful information for the housewife is the fact that motor driven appliances such as washers and vacuum cleaners can be used for 4 to 8 hours for one unit, while an electric iron consumes one unit in 2 to 3 hours—temperature controlled types of iron should be used wherever possible.

Rationing of food and possible delayed delivery of supplies call for the most careful preservation of food, for which a refrigerator will be found invaluable.

Cooking Economies

Cooking ranks with lighting and heating as a problem of economic importance. The two factors of rationed electricity and rationed food have to be taken into account, and in evacuation reception areas an increased household has to be catered for, including children. The requests received by the E.A.W. for hints on evacuation catering first showed the necessity for simple guidance in the matter and a leaflet was therefore issued.

Meanwhile the observance of a few simple rules will enable appetising meals to be economically provided by the electric cooker. Full economy is achieved only if there is a proper understanding of all its parts. The cooker main switch should always be turned off when cooking is finished and as many dishes as possible cooked at one time. The minimum of time and heat is used if the preliminaries to switching on are thoughtfully attended to. The shelves in the oven should be carefully arranged and all surplus tins removed.

The use of residual heat is an economic advantage of electric cooking. This heat should be used by switching off before the food is quite ready to serve or by having something to go into the oven which will cook on the retained heat. When the oven is used for one or two dishes requiring short cooking periods or a falling temperature full advantage should be taken of the heat-retaining properties of the electric oven by switching off when a hot oven has been reached. Consideration must, however be given to the varying temperatures of different types of oven.

It is essential that the right type of utensil be used; flat-based pans should be used on the solid type of boiling plate and the whole surface of the boiling plate should be covered by a large pan, even though a small quantity of food is to be heated. Lids on pans will conserve heat and several pans will keep boiling on one boiling plate.

One-pot dinners cooked on the electric cooker economise in time, attention and electricity, while enabling less expensive foods to be used. The boiling plate should be switched on to full until there is a vigorous steaming and then turned low for simmering to continue throughout the cooking period. A good head of steam will ensure that the foods cook well and that flavours do not mix.

A few suggestions regarding the use of oven utensils assist the housewife's saving. Bright shiny pans reflect the heat away from them, but pans darkened through use absorb heat more readily and brown the contents more quickly. Glass absorbs heat easily and is excellent for time and heat saving, since food may be cooked and served in the same container. Bread tins pack into an oven with the greatest of ease and all kinds of food may be cooked in them.

In the present conditions the importance of electricity's economic service to the housewife becomes even more apparent, when it is rightly used. It is instruction in its right use which householders are requiring, as evidenced by the stream of requests received by the Electrical Association for Women arising out of the publication of its practical leaflet.

cost of such systems is too well known to need any detailed discussion, and the lack of flexibility is also obvious. The termination of switch and socket-outlet points in cast-iron or pressed-steel boxes, most of which possess no provision for any sort of extension from them—even knock-outs can hardly be said to provide this facility once the box has been installed—means that considerable disturbance to the building must take place in the event of any small alteration or extension being required, and an additional lighting socket-outlet may even necessitate a run back to the distribution board. If the heavy-gauge system has been installed without the provision of termination boxes as required by the Regulations, it has lost its "cast-iron" characteristic, and is no better than other systems installed at lower cost. On these two counts, therefore, cost and flexibility, heavy-gauge conduit wiring systems may be dismissed.

As regards lead-covered wiring systems, it has been my experience that if these systems are properly installed—and I feel that nobody would advocate that they should ever be used except under the rigid requirements as laid down in the Regulations—they are as costly as heavy-gauge conduit systems. There is, too, the general distrust of their mechanically-weak continuity devices, and although this difficulty has to some extent been overcome with the introduction of the bond-wire lead-sheathed system, yet even so, if this comparatively large sum of money is to be spent, then it is better to employ a mechanically-sounder system, such as heavy-gauge conduits, which can in most cases be obtained at equal cost.

Flexibility and Cost

On the score of flexibility lead-sheathed systems possess distinct advantages over steel conduit, however, and extensions are more readily made, but on the grounds of cost, combined with only half-efficient earthing security, I am grouping lead-sheathed wiring systems as not representing the ideal for domestic premises.

Regarding the question of costs, although the above comparisons are based upon pre-war prices for material and labour, it may be expected that under present conditions these will rapidly rise in connection with heavy-gauge conduits, and probably to an even greater extent with lead-sheathed cables—if the experience of the last war is any guide. Both of these wiring systems demand, too, the highest grade of labour, which is even now scarce, and may be expected to become more so as time goes on. On all counts, therefore, it may be expected that these systems will decrease in popularity for domestic electrical services, and scarcity of supplies will add another difficulty; metallic wiring systems will all share in this particular disadvantage.

The choice of a suitable wiring system therefore appears to lie between light-gauge steel conduits and some form of insulated wiring system, the latter being solely represented to-day by tough-rubber-sheathed cables with insulated accessories. To deal with the first-named, it is admitted that some thousands of perfectly useful installations carried out with this system are almost daily connected to the mains, and they will give many years of good service. Even so, this system cannot be said to represent the domestic ideal, for if it has been properly carried out it embodies the iron switch and socket-outlet boxes called for in the Regulations, with consequent difficulty in carrying out easy and low-cost extension.

The Regulation requirement to install boxes for the reception of switches in connection with light-gauge conduit systems has done much to discourage the use of this material, and without the use of metal enclosures at termination points the system becomes simply a network of unconnected conduits, with dangerous potentialities. Although the cost of a properly-installed light-gauge conduit system may be only half that of its heavier brother, yet the loss of flexibility and ease of extension, due to such metal enclosures, must remove it from any pretence to being the ideal system.

Risk of Damage

In addition, light-gauge systems are vulnerable to mechanical damage, especially in the form likely to be encountered during building operations. The laying of floors over light-gauge conduits often results in the driving of nails through them, and it is often difficult to place the conduits so as to escape this risk. If the wires are already drawn in, some expense is entailed in their removal and replacement, although I have met with cases where the nail has been withdrawn and the wires left to take their chance; even if new wires are drawn in, the awkward burr left on the inside of the tube wall may cause further damage, as the complete removal of the damaged conduit occasions considerable disturbance and greater cost. With the recent feverish erection of gas-proofing measures in dwelling houses this vulnerability to nails, etc., has become very evident, and the removal of the damaged sections has caused considerable expense.

Electrically, light-gauge conduit systems, especially as regards earthing and continuity, must always be suspect; the usual dependence for earthing upon several lug or pin grips in series is simply not good enough, and after any general disturbance to the building it can generally be found that continuity does not exist. The drawing-in of a bare-copper earthing lead with the circuit conductors improves this factor, but increases the cost, and in any case in the interest of safety the steel conduits must themselves remain continuous, even if not relied upon for the earthing of apparatus in the more vulnerable situations. The tendency towards increased cost in the near future, in general with all metallic wiring systems, should be taken into account when assessing the suitability of light-gauge wiring system under modern conditions.

Tough-rubber Cables

The fourth and last system, tough-rubber-sheathed cables with insulated accessories, provides a system which embodies the points necessary for domestic installations, notably low cost, extreme ease of extension and alteration, maximum safety and freedom from risks of mechanical damage. Taking these points in order, low cost is ensured by the speed with which this material can be installed, and, in general, the smaller quantities required. By this, I mean the practice of running directly across a floor, from corner to centre, and not taking the more usual conduit route round the walls, resulting from the drilling of joists to take the cable instead of cutting slots on the top. This has the further advantage of placing the t.r.s. cables out of reach of flooring nails, and enables lengths to be drawn in or out as required. Switch runs are usually accommodated in rubber-bushed unearthed tubes in brick walls, and run loose inside partitions or behind panels. For lighting, three-plate ceiling roses eliminate the need for junction boxes, and each lighting point becomes a potential extension point; this is, however, wasteful of cable, and if long runs are involved the standard junction box can be employed, with no loss of this valuable feature.

Where earth circuits are required, the use of t.r.s. cables with continuous bond wire incorporated, now a standard supply, ensures that this important circuit is at least as reliable as the remainder of the circuit, and is not subject to the interruptions common to all other systems, whether due to mechanical or chemical causes. The present excellent range of insulated accessories of every type completes a system which is, in my view, ideal for residential buildings, embodying the advantages of all other systems without their shortcomings.

Unfortunately, the attitude of the industry itself is responsible for the fact that this system has not been more generally adopted. The term "cab-tyre wireman" is one of reproach, and views have been expressed indicating that t.r.s. systems are more liable to fire risk than metal-clad systems. In any careful study of the causes of established electrical fires, however, it will be found that these are more likely to be due to failure of earthing circuits than any other single cause, and the t.r.s. system is independent of such failures. Further, t.r.s. cables are less liable to troubles set up by condensation than other systems.

Careful Installation Needed

As indicated by the current Regulations, t.r.s. systems, although simple, require careful installation. In the case of surface work some skill is necessary, although appearance may be improved with the free use of wooden beadings placed over all surface runs; the old fire-risk objections to v.i.r. cables in wooden casings on DC supplies cannot persist against t.r.s. cables in similar casings on AC supplies. Surface runs may often be obviated with t.r.s. cables, as they can be taken with safety through any ceiling hole and fished for to reappear at some other point, an advantage possessed by no other system. Finally, it is unlikely that costs will rise in anything like the proportion to be expected with steel conduit or lead-sheathed wiring systems, and supplies should remain reasonably available in the future.

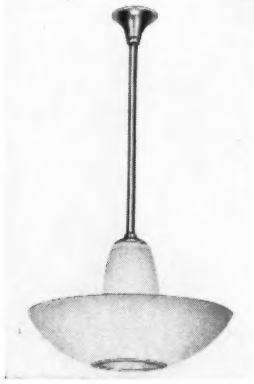
The adoption of the t.r.s. system for the wooden-built hutments intended for the new armies must surely indicate that the old bogy of fire risk has been laid. I had not fully realised the extreme flexibility of the system until I wired my own house with it, and practical experience over the past five years confirms the claims of its protagonists. In restating the requirements of wiring systems for residential buildings—cost, safety and flexibility—t.r.s. systems possess advantages in these directions over other systems; in addition, maintenance, especially if damage be caused by external action, is simple and requires no special accessories. In any event, such systems should suffer less than the more rigid metallic systems under concussion or other factors now unfortunately to be taken into account.

Lighting Fittings

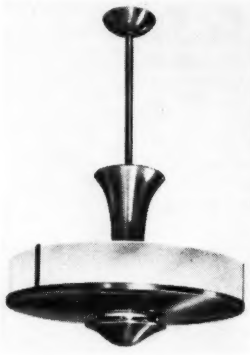
MANY NEW DESIGNS

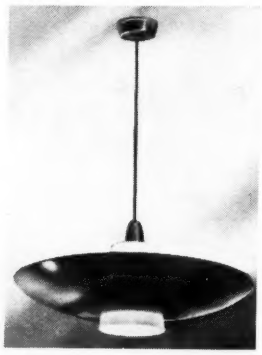
NOW that the first feverish rush to "black-out" is over, most people are already beginning to wonder whether they have tackled the job in the best possible way and whether they are destined at night-time (and perhaps day-time too) to have their homes, or at any rate a large part of them, in a permanent state of semi-darkness "for the duration." They have gone to an extraordinary amount of trouble to darken their lamps and lighting fittings, so as to reduce or screen the light emitted, and while this may, of course, be necessary in exceptional cases, it seems unreasonable and wasteful to impair efficiency at a time when economies in current consumption have to be made.

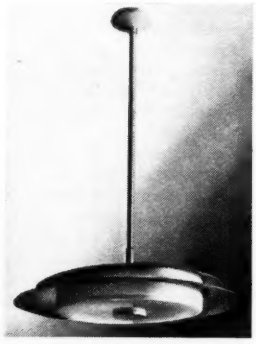
Actually, however, in an average household so little electricity is consumed by lighting as compared with other services that little economy is either necessary or desirable. In fact, if any modification of the lighting is to be made it should be in the direction of improving the illumination. For good lighting has a definite psychological effect which should be utilised to its full in the coming dark days. Moreover, on account of the light-absorbing and non-reflecting character of the dark materials now used so extensively for obscuring the windows, &c., more light is necessary to produce the same general intensity of illumination in the room.



G.E.C. pendant giving concentrated downward beam



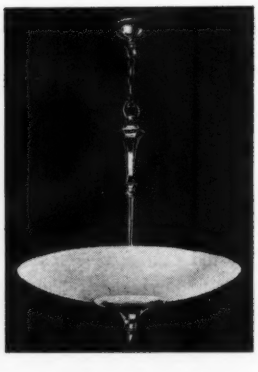




Left: Troughton & Young anodised aluminium semi-indirect fitting. Right: Best & Lloyd pendant. Above: G.V.D. indirect fitting

A scheme for efficiently covering all windows and outside doors makes it possible to employ normal lighting fittings, in most cases without any form of screening and without employing special tinted or sprayed lamps. From the point of view both of current consumption and of eyesight the fittings used should obviously be of the highest possible efficiency. Actually it will often be found practicable, by substituting a modern fitting for an existing unit, to use a lower wattage lamp and still improve the lighting.

It is therefore fortunate and appropriate that the most noticeable tendency in lighting fitting design during the past months has been in the direction of increased efficiency coupled with simplicity.

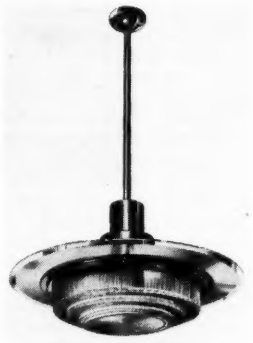


Left: Berry dish type pendant. Above: Troughton & Young louvre fitting. Right: Osler & Faraday modernised version of Grecian design

Without doubt the type of unit most in favour to-day for the living room, and to a less extent for the dining room too, is the plain bowl pendant, having one or more, usually three, lamps. Not only does it give a good, well-diffused general lighting, but its simple lines make it suitable for any scheme of furnishing, and it is not likely to "date."

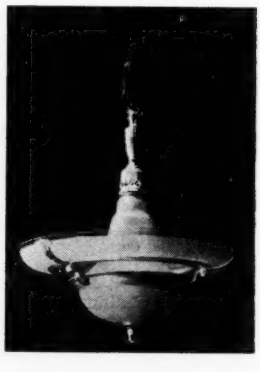
Almost all manufacturers run lines of this type. The simplest of them are inevitably very similar in design, and it is only in the "not quite so plain" types that originality can be shown. In this connection Frederick Thomas & Co. have employed decorative suspension rods with pleasing effects in some of their "Efteelite" fittings, and a halo round the edge adds a touch of distinction to many of the Siemens models. Similarly decorative glass fins have been incorporated in the design of the new pendants introduced by Falk Stadelmann.

To meet the requirements of the lower ceilings common to-day shallow types of pendant are especially in demand, and there is a strong leaning towards the dish type pendant with bowls as wide as 2 ft. or more in diameter. Typical examples of the latter are to be found in Berry's "Crystal Ray" unit with its rim of crystal glass round the edge and the "Spray," a more elaborate fitting with two wide cascades of glass falling from the centre suspension. A feature of development pointed out by Osler & Faraday, and particularly noticeable in this type of fitting, is the greater care now being taken in the uniform lighting of the glassware, and patches of light caused by the lamps showing through the glass are absent from most units made to-day.

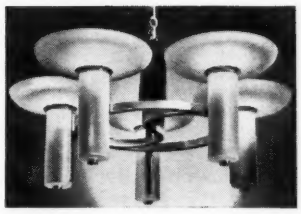


Holophane "Steplite"

Another interesting tendency with regard to the bowl or dish-type pendant is the increasing number of units designed to give indirect or semi-indirect lighting. This is especially noticeable among the products of such manufacturers as G.V.D. Illuminators, Best & Lloyd, Harcourts and Berry's Electric. In the semi-indirect units the proportion of direct and indirect illumination varies considerably, but in many fittings constructed of metal spinnings the downward light is quite often only used for decorative purposes—usually, as in the new Harcourt "Stanhope" and "Stanmore" and the Benjamin "Anolier" fittings, as a means for faintly illuminating the undersides of the bowls and thereby removing the otherwise dark appearance of the fittings.

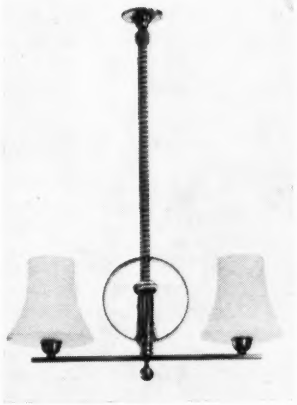


There are, of course, other semi-indirect units constructed after the style of shop counter lighting pendants, which project most of the light directly downwards. These are especially suitable for dining rooms since it is on the table underneath that most of the illumination is generally required. An advantage, too, from the "black-out" point of view is that only light of low intensity reaches the windows.



Dernier & Hamlyn 5-light pendant

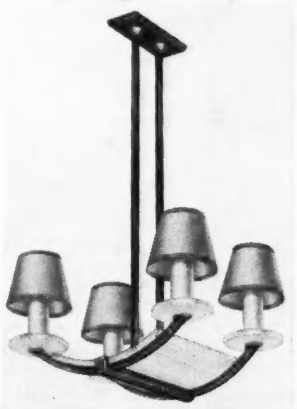
In this type of fitting effective use is often made of louvres, as in the case of the new Harcourt "Harrex" and in some of the Troughton & Young designs. To obtain the same result the G.E.C. in a new range particularly suited to small dining rooms has the bowl suspended on the rim of a shade which has the top part frosted and the lower part clear. Another means of procuring a strong downward light with a small amount of illumination upwards is made use of by Frederick Thomas & Co., who have fitted silvered reflectors a short distance from the top of the totally enclosed opal globes.



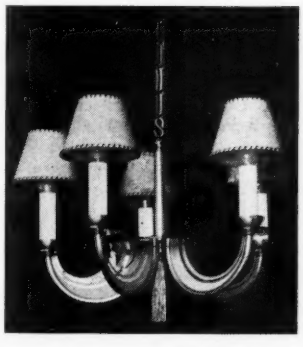
Henry Bisseker pendant

Totally enclosed fittings, by the way, are in moderate demand for the larger type of room. Both Fredk. Thomas & Siemens make a speciality of these, the latter having recently added additional attractive units to their "Silvaray" series. As a development of their circular three-tier "Steplite" units Holophane have brought out a pendant type fitting with a glass halo effect. The decorative "Supreme Finray" fittings (L. G. Hawkins), of which no fewer than 140 different designs are made, are still as popular as ever.

Three-, four- and five-light pendants remain in favour, for dining rooms especially, and here, too, a very marked improvement in efficiency is noticeable. Until recently the shade in this type of fitting really was a shade and simply cut off most of the useful light from the lamp. The shades employed to-day, however, are mostly of almost transparent material, often glass, which serves only as a diffuser and as a means of preventing glare. Good high-efficiency pendants of this type giving good shadowless lighting are to be found among the products of such makers as Dernier & Hamlyn, Henry Bisseker and Berry's Electric. An original touch is introduced by Falk Stadelmann in one unit by placing a circular sheet of glass underneath the fitting proper.



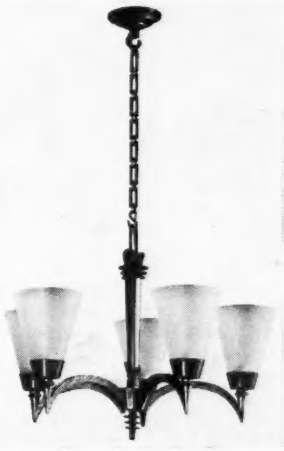
While dealing with this type of fitting it is interesting to notice the individual preferences of manufacturers for having the lamp with its cap upwards or downwards. Berry's, for instance, favour the latter almost exclusively, while Troughton & Young have the opposite taste. There can be little to choose as regards efficiency, but there is the point that the design and robustness of the modern coiled coil lamp enables it to be installed in any position without reducing its life.



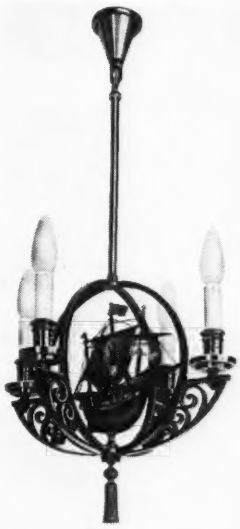
Left: Galsworthy candle effect fitting using ordinary lamps. Right: Morley armour bright wrought iron pendant

Multiple-light pendants also bring to notice another practice which is becoming common, namely, the use of ordinary lamps to simulate a candle effect, among those who have successfully adopted this device being the G.E.C., Galsworthy, Dernier & Hamlyn, Best & Lloyd, and Berry's. Lamps of any wattage up to 100 W can generally be used, with the result that a very much higher lighting intensity can be achieved with this type of pendant than is possible with those taking actual candle lamps. Moreover, ordinary lamps are cheaper and more easily obtainable.

This does not mean, however, that "bona fide" candle lamp fittings are any less popular. On the contrary, the recent introduction of the 40-W gas-filled candle lamp providing a really good light has given a considerable fillip to the sale of this type of fitting. Various successful efforts have also been made to produce still more realistic effects. An almost complete illusion of candles is secured by Allom Bros. and Whiteway Lighting, Ltd., by using special holders and pans fitted to the sconces. In these forms an entirely new type of lamp is concealed and arranged so as to throw the light upwards on to the ceiling. In this way a soft, diffused indirect illumination is obtained, brilliant enough to read by in comfort, yet perfectly restful, while the chandelier itself, being flooded with light becomes a decorative feature. Almost any type of chandelier can be adapted to take this new form of lighting, but it is at its best when a crystal chandelier is used.

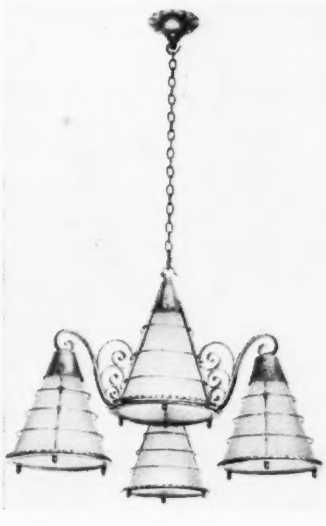


Galsworthy modernised period fitting



Left: G.E.C. rough-cast glass design. Above: Morley galleon pendant

Referring to crystal pendants we are told by Osler and Faraday that there has been a considerable revival in their use for bedrooms. The same company also expresses the opinion that the public is getting tired of "modern" designs, and is evincing a preference for "period" and reproduction lines. Other firms, too, are having much the same experience with the result that the production of modern lighting with period effect has been the aim of several of the latest fittings made not only by Osler & Faraday, but by Galsworthy, Fredk. Thomas, the G.E.C., &c. Following the present tendency already referred to, many of these incorporate ordinary lamps where candle lamps

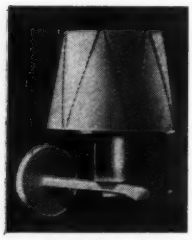


would formerly have been used, though Galsworthys, for one, design some of their fittings for either ordinary or candle lamps. Dernier Hamlyn specialise in faithful reproductions of old wrought-iron or steel candelabra and other fittings. A novel bracket unit in the form of a horseshoe is made by L. G. Hawkins.

Wrought iron appears to be much more popular than wood for pseudo-period designs, and to cater for the market T. B. Morley have recently opened an entirely new department. As a beginning they have brought out six types of pendant, one of the most attractive having a

basket central feature. Cadmium plating is employed largely by Falk Stadelmann for this type of fitting, and they, like Berry's, are making good progress with colour spraying, a process which gives the wrought iron a dainty effect, harmonising well with modern furniture.

Apart from this leaning towards period designs, there is also an indication that in cases where, a few years ago, people were content with a purely functional fitting, they are now requiring something a little more ornamental, yet still not a dust trap. No better proof of this could be found than by a study of the attractive range of fittings offered by Troughton & Young, whose use of Poole pottery for wall brackets, &c., is a case in point.

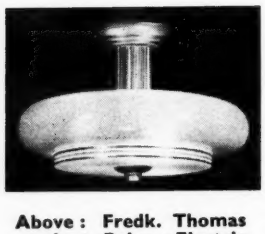


Best & Lloyd wall bracket

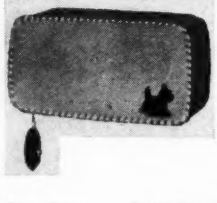
New materials and finishes are constantly being developed, and one of the most satisfactory, already employed by Best & Lloyd, Osler & Faraday, Troughton & Young, and others, is anodised aluminium. Its principal merit, apart from its lightness, ease of working, and high reflection characteristics, is that it can be finished in a wide range of attractive pastel tints. Chromium plating by itself has largely gone out of fashion, though, combined with glass or wood, it is used effectively by Waite & Son for some of their latest floor standards.

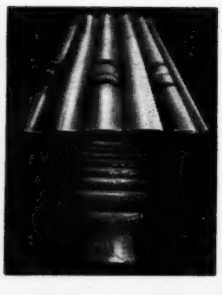
Glass in attractive new forms includes a roughcast type effectively combined with wrought iron in certain G.E.C. fittings, and various new parchment, moulded and other composition materials provide a touch of originality. A suède-effect finish for their glassware has been developed by Dernier & Hamlyn, while crystal thread in the form of a net is a charming fabric now used by Berry's. Catalin, "Linette," heavy wool gimp, barbola trimming, opaline material with fabric binding, stencilling and appliqué work are some of the decorative devices favoured by Waite & Son. Best & Lloyd find grass cloth and sisal string a pleasing combination. These new materials are especially suitable for bedroom fittings, and it is becoming more and more usual to have the whole set of fittings—central pendant, dressing-table light, bedlamps, &c.—made *en suite*. A novelty introduced by Dernier & Hamlyn in some of their new "Litlux" bedlights, and some of their table lamps, too, is the use of wire as a decorative medium. Hand-painted designs of crinoline ladies, "Scotties," and flowers are a feature of the "Electa" bedlights made by Elec-

Realistic candle fittings by (left) Whiteway, (below) Osler & Faraday and (right) Allom Bros.



Above: Fredk. Thomas pendant. Below: Electric Art Shades bedlamp



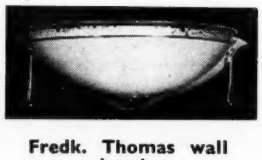


Dernier & Hamlyn wire lamp, a Shelley Potteries design and the Bobin "Panda" nursery fitting

tric Art Shades with new reflector backs giving maximum light.

Instead of the usual counterpoise weights and brackets, a clip is fitted to Ward & Goldstone's "Cliplite" unit, suitable not only for attachment to beds, but in any other required position. L. G. Hawkins, too, have a new fitting, the "Moonbeam," incorporating a lens to focus the light; this is very useful in bedrooms where the A.R.P. black-out is not so effective as it might be, or for focusing the light on to a book, &c., so as not to disturb other occupants of the room. A new Castelco lamp has an illuminated alarm clock built in, while the Walker Fender Co. has produced a twin bed lamp, each side of which can be used independently.

Probably the most interesting of recent developments in connection with table lamps is the production of a two-filament lamp designed so that either or both of the filaments can be in circuit. This lamp, available in two sizes (60/100 W and 100/200 W), is at the moment considered a special line by the makers, though H. & C. Electric Lamps, Ltd., have already introduced as a standard product a range of double filament lamps from 50/50 W to 250/250 W designed for series/parallel operation. With both types of lamp no special design of fitting is necessary, although special lampholders or adaptors must be used.

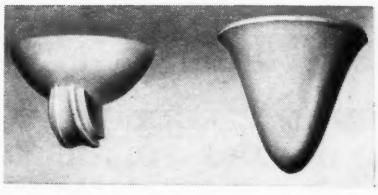


Fredk. Thomas wall bracket

The multiplicity of table lamps now available renders it very difficult to select any types for special mention, but among those that come most readily to mind are the new cut-glass models made by Osler & Faraday; units with clocks, calendars, &c., incorporated, made by the Walker Fender Co.; the B.T.H. "Clustalite" with twelve lamps wired in series, and also equally suitable as a pendant or ceiling fitting; the new range of Kandem study lights; Straight-Lite Reflectors' desk light, incorporating a "Maxtrip 2" tubular lamp; solid oak and elm fittings emulating vases and pottery by Mallinson Eckersley; and various competitive lines made by Maurice Bobin and the Grafton Heater Co.

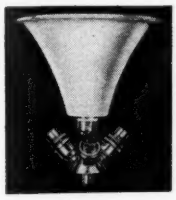
"Figure" lamps have to some extent gone out of fashion, though a "Panda"

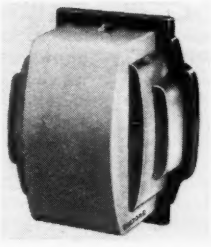
design by Maurice Bobin and a "Scottie" silhouette by L. G. Hawkins make it difficult to understand why. Easily the most popular of table lamps to-day is the vase type. Of these, Shelley Potteries and Dernier & Hamlyn draw our attention to new designs. The combination of table lamp with book-end, book-holders and ash-trays is a novelty of Beethoven Electric, who also combine very effectively standard lamps with tables, or even nests of tables. Tables, clocks, &c., are similarly incorporated in some of the Walker Fender Co.'s designs. Both this company and Waite & Son make special fittings to illuminate bridge tables, and this season both Courtney Russell and W. T. French are making a speciality of wooden floor standards, finished in an attractive range of colours. The "Bow" and "The Lady in the Garden" are the names given to two charming shades for standards made by Maurice Bobin.



Hollmann plastic indirect wall bracket

Bobin standard shade and (below) a Berry "Berrycone" attachment



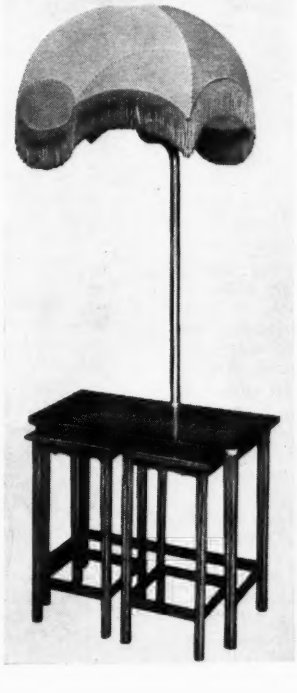


Ward & Goldstone plastic wall bracket

B.T.H. "Newelite"

The most striking development in standard lamps, however, is in the production by a number of manufacturers, among them the G.E.C., Osler & Faraday, Berry's and the Walker Fender Co., of units designed to give, by means of a special reflector, either direct or indirect lighting, or both. This method of securing indirect lighting is felt by some to be better than using indirect pendants or concealed lighting, since these by themselves may give the room a somewhat cold appearance.

However that may be, indirect lighting for general illumination supplemented by local lighting for reading or sewing is making steady progress. G.V.D. Illuminators, who make a speciality of indirect lighting, have introduced in addition to a new 15-in. shallow pendant in anodised aluminium, an attractive range of indirect wall brackets made up in wood to match any furniture. Oswald Hollmann also have brought out several new lines including a range of plastic indirect units which can be used either in the natural state, finished by the decorator, or supplied finished to suit customers' requirements. With the wall brackets special reflectors can be supplied to throw the light out into the room. Monolamp make a standard lamp for indirect lighting.



Courtney Russell floor standard and (right) a Beethoven standard combined with a nest of tables

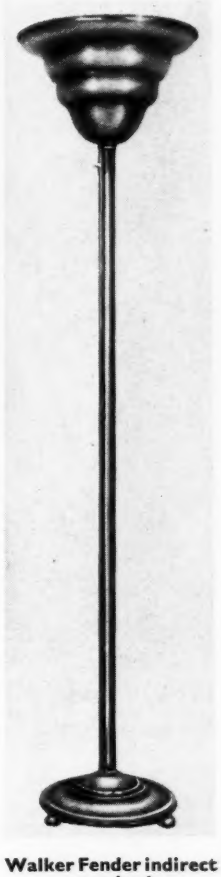
Troughton & Young, and Holophane both tell us that built-in lighting is being used more. The latter company's flush ceiling and semi-recessed fittings have been welcomed by architects as a solution of the difficulties of low ceiling heights in modern houses, and include the "Controlens" prismatic light control system. Due largely to the reduction in price of the 10- and 12-in. architectural lamps there has also been considerable progress in the use of line light sources for decoration and for such utility purposes, as for bathrooms and for grouping in fittings. Many attractive fittings for these purposes are made by Straight-Lite Reflectors, Ltd. The "Linolite" system of concealed lighting is especially applicable to present conditions.

Points observed about totally enclosed utility fittings for kitchens, bathrooms, &c., are the hinging of the bowl by the G.E.C.; the threading of the glass by Falk Stadelmann; the push-on fixing of the "Hartility" fitting by Harcourts; the rubber gasket used by Ward & Goldstone to prevent the entrance of moisture; and the very wide selection of designs offered by Simplex. Vidor have lights combined with lavatory fittings, and the B.T.H. make a special unit, the "Newelite," for mounting on newel posts.

An interesting variation of the popular adjustable lamp is a new G.E.C. unit which can be hung on a picture rail and adjusted to any height. The Cooper & Smith "Heley Rigalite" desk lamp is another new adjustable fitting, other suppliers of this type of unit being the Typerlite Co., Mek-Elek, H. Terry & Son ("Anglepoise"), John Dugdill, Drake & Gorham Wholesale and the Electric Depôt.

Most manufacturers are making special A.R.P. shades, and details of a number of these have been published in the ELECTRICAL REVIEW during the past few weeks.

Among the latest of these fittings is the Rowlands Electrical Accessories' all-metal shield of collapsible construction giving three lighting intensities: it has a blue visor at the bottom. Pendant, gimbal and bedlight shades are made by Electric Art Shades of an opaque card, green on the outside and white inside, and the same device is being used by Waite & Son for their table units.



Walker Fender indirect standard

A moulded material has been utilised by Ward & Goldstone for their shade. In the Nox shield the top part is fixed permanently to the lamp, the lower portion being readily attached during black-out hours, while a special A.R.P. adjustable wall bracket made by Harcourts, called the "Flexo," enables the light to be directed in any direction required.

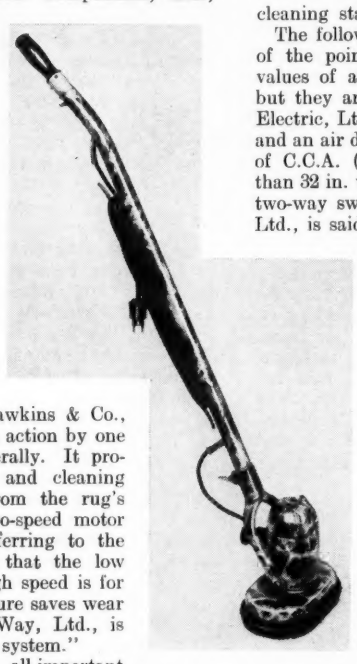
Cooper & Smith "Heley Rigalite"

Portable emergency lamps specially designed for use in black-out conditions have been produced by Ward & Goldstone (the "Arplyte"), L. G. Hawkins (the "999 Supreme"), Easco, and Oldham & Son (the "Toucan").

Home Cleaning Appliances

TREND OF DESIGN IN ELECTRIC VACUUM CLEANERS AND FLOOR POLISHERS

FOR the sake of easy reference, in the following notes vacuum cleaners are classified as exterior- and interior-bag. The former type carries the dust bag partly on and in line with the "broom" handle and is more generally known as the upright cleaner, but it also includes hand models. In the latter the dust bag is housed in an outer container which is part of the main body, and this type may be sub-divided into the horizontal-cylinder and canister classes.



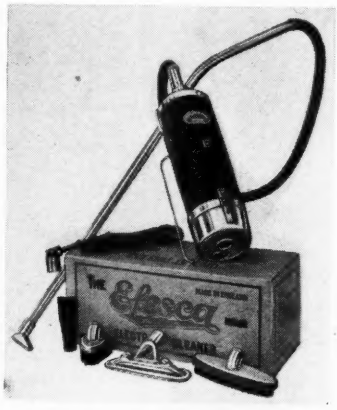
(Above) Upright cleaner by Edison Swan. (Right) The Bylock floor polisher

Although opinions differ on the use of brushes with upright cleaners the motor-driven brush has now become well established, and among those cleaners incorporating it are the "Sector" by Electrical Components, Ltd., the model "R. Diehl" (sold by Herbert D. Bamber), the upright cleaner of Pye, Ltd., and the "Universal" No. E3301 of L. G. Hawkins & Co., Ltd. The following description of the action by one concern is typical of the claims generally. It produces a triple, vibrating sweeping and cleaning action that speedily removes dirt from the rug's backing to the nap surface. The two-speed motor idea is growing and J. Toubkin, referring to the "Cadillac De Luxe" cleaner, state that the low speed is for light cleaning and the high speed is for thorough deep cleaning, while the feature saves wear on the motor. The cleaner by Air-Way, Ltd., is described as having a "twin-motored system."

The fan and its drive are, of course, all-important to suction, but attention is given also to the "application" of suction, mainly towards nozzle design. The "Apex" cleaner by Rotapex, Ltd., has a divided nozzle by which the suction is spread across its full width. We believe that one of the most important considerations to the user is easy dust-bag manipulation and the Edison Swan Electric Co. states that the dust bag of its machine has been enlarged and fitted with a special mouth to facilitate the removal of dirt. Detachment is very easy.

Vactric hand cleaner

It is vital that the total weight of the hand cleaner should be as small as possible and the extent to which manufacturers have been able to limit dimensions without sacrificing good construction is remarkable. Illustrating this point there are the new "Junior" cleaner of Eureka Electric, Ltd., which weighs 4¼ lb., the "Little Wonder" of the General Electric Co., Ltd., which weighs 4 lb. 13 oz. net, the 4¾-lb. unit by Siroma Engineering Co., Ltd., the model by Vactric, Ltd., which measures 6¾ in. high and 4½ in. wide, and the A. C. Gilbert Co.'s machine which is described as being no bigger than a carpet brush. Although the "Goblin Wizard," the British Vacuum Cleaner Co., Ltd., is an upright machine, by removal of the handle it can be used as a hand model for cleaning stairs, &c.



"Efesca" cylinder-type cleaner

The following notes refer to interior-bag cleaners, but some of the points raised concern all types. Opinion as to the values of air displacement and suction figures vary greatly, but they are of definite interest. The "Triplex" by Bylock Electric, Ltd., has three fans giving a water suction of 45 in. and an air displacement of 80 cu. ft. per min. The "Siloluxe" of C.C.A. (Vacuum Cleaners), Ltd., has a suction of more than 32 in. water gauge from its double turbine impeller. The two-way swivel nozzle of the cylinder cleaner by Electrolux, Ltd., is said to make use of the maximum suction.

Easy machine propelling as distinct from motor driving is important and the lengthy well-spread and rounded-end sliding rails of the "Purley" cleaner of Bowthorpe Electric Co., Ltd., are a good illustration of the attention given to this aspect. The bakelite case such as that of the "Efesca Minor" of Falk, Stadelmann Co., Ltd., is another trend. To cite two canister-type cleaners as typical of the class there is the 13-lb. two-stage unit by British Electric Equipment Co., Ltd., and the model S51 by Tellus Super Vacuum Cleaner, Ltd. In connection with the latter our attention is drawn to the capacity of the dust receptacle—2,125 cu. in.

Vital points relating to floor polishers are speeds and weights. The Vactric has motor and brush speeds on wood of 6,800 and 950 respectively, and the complete weight is 21½ lb. The six-inch brushes of the Bylock polishers run at 660 RPM and the machine weighs 22 lb. The Bowthorpe polisher weighs 28 lb. Good power transmission is vital.

"Sector" upright cleaner (Electrical Components)

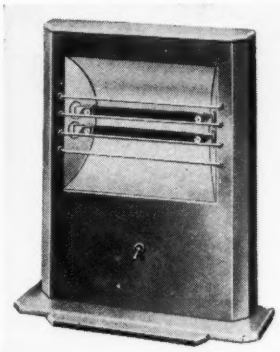
The two rotary brushes of the G.E.C. polisher are friction driven from the shaft, the mechanism being totally enclosed. The brush of the polisher of the Sunbeam Vacuum Cleaner Co. (1938), Ltd., has a double belt drive. The C.C.A. "Suction Poliflor" is a combined vacuum cleaner and polisher and the Siroma B. model affords a dual polishing operation by means of the revolving brush and felt pad. For large floors the Electrolux "Triple" polisher operates with three units.

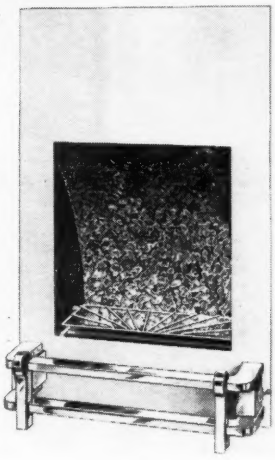
Heating Equipment

REFLECTOR FIRE AND CONVECTOR DEVELOPMENTS

THE outstanding development in the field of domestic space-heating equipment during the past year has been the preponderance of new reflector fires. Most of these are distinguished by their wide reflectors, and by this we do not necessarily mean wide-angle reflectors.

One of the earlier conceptions of the reflector fire still has a very big appeal. It is the type in which the element is welled in the base of a tall-back reflector. The "Renown" fire of the Hotpoint Electrical Appliance Co., Ltd., belongs to this class and is made of substantial sheet-copper. The hammered surface of the reflector is claimed to contribute towards spreading of the heat rays. An opening at the base affords the projection of a beam of heat along the floor. A fire by the Jackson Electric Stove Co., Ltd., also has a very tall back, but the bottom of the reflector under the elements extends to the front in almost a horizontal plane.



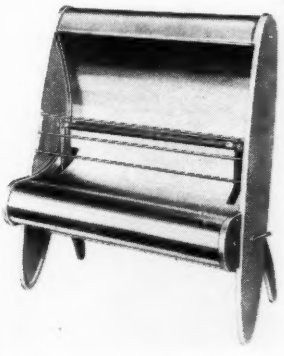


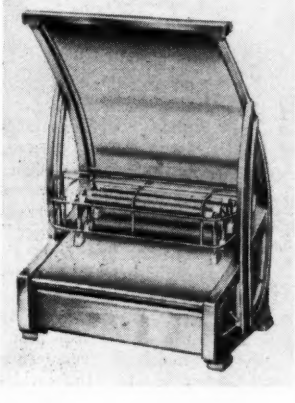
Above: The "Creda Pentland." Right: Hotpoint "Grosvenor"

The "Reflex" fire of the Midland Electric Manufacturing Co., Ltd., is hardly of the tall-back type and the wide reflector is similar to that of the small trough reflector in formation. The reflector proper is chromium plated and is set between triangular cast-iron ends. The "Paranova" of Premier Electric Heaters, Ltd., has a reflector which has a height at the back of 22¾ in. from the floor and extends 10⅝ in. from the front at the bottom. The top leans forward and there is a downward slope at the bottom. The "Radiant" unit of Eveson Brothers, Ltd., has a loading of ¾ or 1 kW in one rod element set in a tall-back chromium reflector carried in two simple cast ends following the line of the reflector itself. The "Projector" of Belling & Co., Ltd., has a deep and large reflector and this takes up nearly the whole of the front of the fire, which presents a pic-

Right: G.E.C. wide-angle unit.

Below: The Premier Paranova

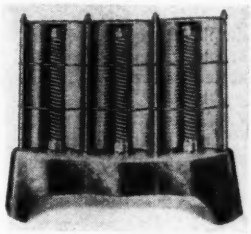


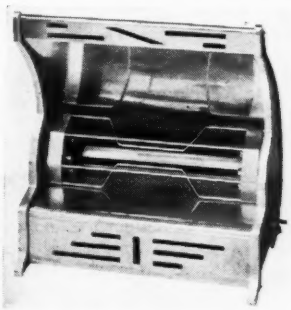


ture frame type surround.

The wide-angle reflector fire is not, of course, by any means new to Ferranti, Ltd., but a new model is the "Minex," an attractive and inexpensive light-weight fire loaded only at 1 kW (single rod element) and having a "Solium" or chromium reflector. The new D2705 reflector fire of the General Electric Co., Ltd., is also of the tall-back type, but at the top the reflector is turned over towards the front to form a canopy and at the bottom it is turned under so that the reflecting surface presents itself as a cylinder right at the front of the fire. The "Radiant" fire of H.M.V. Household Appliances represents probably the last word in reflector angle width. By means of curvature in both the vertical and horizontal planes dispersion of heat is provided for throughout an arc of 160 deg., giving, it is said, a nice balance between general and concentrated warmth.

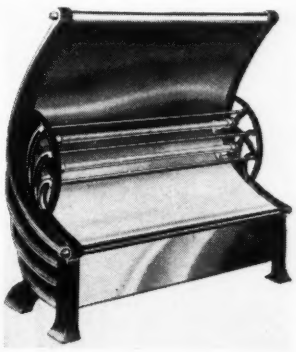
The "Projector" fires of the Arora Co. have trough reflectors in two





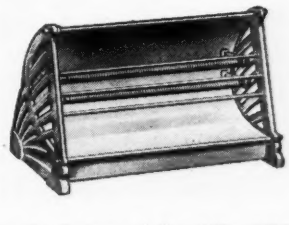
Left: The Jackson No. 773 Reflector fire. Above: The Siemens "Norfolk" wide-angle reflector fire

adjoining sections and the one-bar (1 or 1.5 kW) model is a squat affair with the bottom of the horizontal reflector near the floor level. In the "Flamingo" of Bratt Colbran, Ltd., we see an excellent illustration of the large reflector idea in contrast to the wide angle. Set in simple case ends, this trough reflector is symmetrical. Carron Company's "Beaconette" has a non-swivel reflector of solid brass, heavily chromium plated. The "Raphael" of the Dowsing Co. (Electrical Manufacturers), Ltd., has a trough reflector nested in a metal tube frame. In the "Avon" reflector fire of Morphy Richards, Ltd., the angle at which the reflector top leans forward gives a definite note of distinction.



Morphy Richards Avon

The "Pentland" of Simplex Electric Co., Ltd., has its reflector recessed within a metal body and a feature of such box-like construction is that the reflector has end reflecting surfaces. The "Supreme Empire" fire by L. G. Hawkins & Co., Ltd., is also a wide-trough unit and is suitable for both wall and floor mounting by virtue of the adaptable base units which serve either as legs or brackets. A feature of the wide trough fire No. 1605 by T. Price & Son (Stampers), Ltd., is the heavy cast frame, an unusual construction for reflector equipment. There are two 1-kW rods within the one chromium reflector. The 1-kW "Malvern" by the English Electric Co., Ltd., may be described as a medium-width reflector unit. The somewhat slender triangular legs provide for both floor and wall mounting. A narrow, but

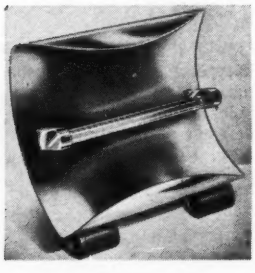


M.E.M. Reflex

wide-angle trough reflector is the feature of the "No. 126" equipment of the Grafton Heater Co., Ltd.

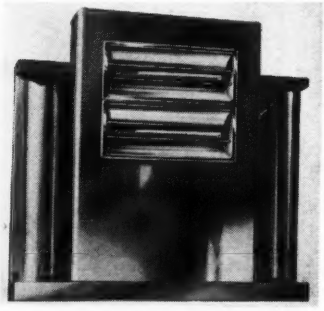
The reflector type of fire in which each rod is separately troughed seems to have made further progress with both

vertical and horizontal reflectors. The "Medway" by Revo Electric Co., Ltd., has two vertical bars and it can be mounted on the wall as an outset fire with a top shelf, or it can be reversed for wall mounting. The Co-operative Wholesale Society, Ltd., has a "Floodlit" fire with two vertical troughs well spaced in a framed surround which issues a glow from a canopy at the top. Electroway Heaters, Ltd., are responsible for a novelty in the circular inset fire "V.D.2b."



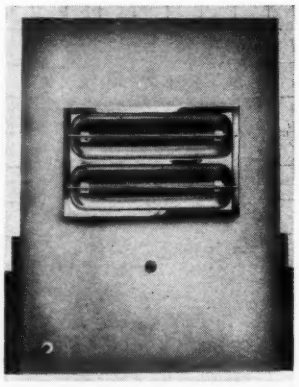
Above: H.M.V. "Radiant." Right: English Electric "Malvern"

In the horizontal-element class there are the "Adapto" two-trough unit which is designed to make simple the conversion of a fireplace (British National Electrics, Ltd.); the "Grosvenor" with its two separator reflectors mounted on the face (Graham Farish, Ltd.); the "Berrette" with its single trough recessed in a plain "solid" front body (Berry's Electric, Ltd.); the No. 64 "Swinton" fires in which the two or three troughs are stepped vertically out of alignment (Hattersley Bros., Ltd.); and the "Neptune" with its spaced troughs and ornamental guards (Falk, Stadelmann & Co., Ltd.). Corner fires are a profitable line in a more limited field and such equipments by Bulpitt & Sons, Ltd., are available in both horizontal-element and vertical-element models



The "Grosvenor" by Graham Farish

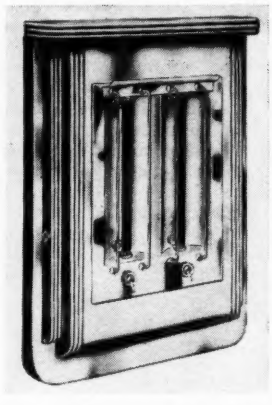
The bowl fire was the originator of directional control; it is still true to the original conception and as popular as ever. The Grafton "Swivel" has a 10-in. solid copper reflector which can be revolved or tilted to any angle. The Premier "Regal" and "Reflex" have solid copper figured reflectors which can be focused in any direction. The Hotpoint "Cobra" is distinguished by its tubular pedestal. The "Burchray" (W. T. French & Co., Ltd.) is mounted on a tubular standard 36 in. high. Brown Brothers, Ltd., have a "Safety-Base" bowl fire which it is almost impossible to overturn accidentally.

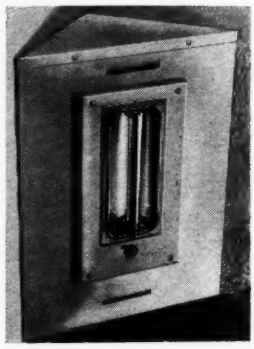


British National "Adapto"

Lest it should be thought from the greater attention we have given to the reflector fire that the older firebar equipment has taken a back seat, we emphasise that although by far most of the newer developments are in the reflector-fire field the fire-bar heater probably still represents the greater volume of business. Efforts towards wider heat distribution are also being made in this field. For example, the Premier "Broadcaster" is described to us as having a fire bar with a very big radius, giving a wide diffusion of heat. The "Gloucester" of Alneco, Ltd., with two or three fire-bars (2 or 3 kW) has been designed specially to cover the fire opening in tiled surrounds. The distinctive note of the Arora "Haven" fires is the tall and slender legs. Vertical fire-bars, although older than vertical reflector-fire rods, are not so common, and we imagine that design from the aesthetic point of view is more difficult. Local conditions offer a limited field for such equipment. Eveson Bros. have a pleasing vertical-bar inset fire with one or two bars. The Alneco "Oxford" fire-bar and reflector fires are a good example of attempts to make one design of body do for both reflector and fire-bar elements.

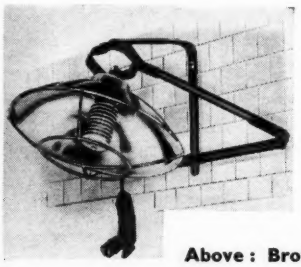
We cannot apologise for a strong hope that the electric fire will never cease to express the art of the foundryman as in the fine figure-work of such fires as the "Mayfair" and the "Cat and Mouse" fires of the Hart Foundry Co. The fire body of massive appearance goes well with certain furnishing schemes and here again the foundryman seems to have got a good hold. The Belling "Embassy" is an excellent illustration of this idea. As a contrast to massive appearance and figure-work there are many fine examples of plain "clean-cut" cast-iron fires, *e.g.*, No. 57 by Hattersley, with downward extending sides for feet, and the Hotpoint "Archway" with its simple modernism. Just to show that the foundryman can do good work for the reflector fire also, we have the English Electric "Windsor" horizontal trough fires and the E.R. 6 wide-angle reflector fire by the "Bank" Hardware Manufacturing Co., Ltd. The clean lines of the former express simplicity and the latter is of the bolder and massive appearance class.



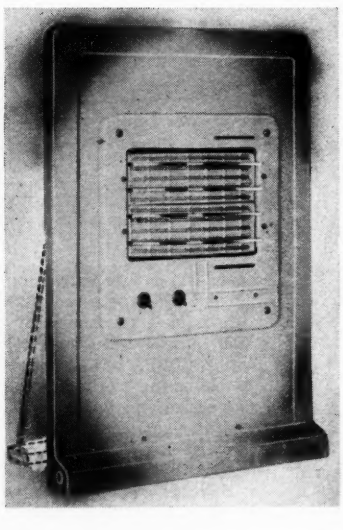


Above: The reversible "Medway" (Revo). Right: A Bulpitt corner fire

One of the biggest advantages to many manufacturers of the sheet-metal fire is ease of production. Some of the Electroway imitation-fuel fires, for instance, have reflector heating units and some employ fire-bars, but in each the frame is of fabricated steel. The G.E.C. D2491 sheet-metal fire has a frame of the easel type common among earlier models of cast-iron fires. The heavy-gauge sheet-metal "Mysto Senior" looks very much like a cast-iron unit. In the Dowsing "Raeburn" distinctiveness is obtained by the "parchment-scroll" front panelling a single fire bar. A better form of construction than the simple "square box" fire could hardly be provided for sheet-metal work. Arora "Chrome" fires are an excellent illustration of this. Simplicity of construction is, of course, always a contribution to inexpensiveness and from this aspect the "Challenger" one-bar fire by L. G. Hawkins is noteworthy. Modernity is well expressed by the tubular frame which is very suitable to the wide-

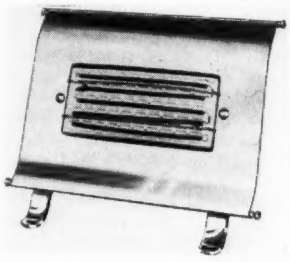


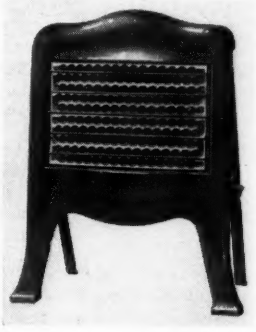
Above: Brown Bros. bowl fire for wall or floor
Below: "Angelus" hearth fire by Chas. Joyner



trough reflector type of fire. An excellent example is the "Twinbeam" by Morphy-Richards in which the chrome reflector is mounted on a substantial frame of chromium-plated tube. The Revo "Tubula" is a handsome equipment of similar design and its reflector is adjustable over a wide angle.

During the phenomenal growth of the inset fire a few years ago consequent on the building trades boom it was often asked if the inset fire had come to stay. The building slump of the past 18 months has provided the answer: It has. The reason is that this type of fire has found logical extensions of its usefulness in small bedrooms, box rooms, corridors and halls in all types of houses—large, medium and small. Easy fixing is a foremost demand for any inset fire now, and in this respect the self-fixing "Quality" firebar and "Utility" reflector fires by Alneco demand attention. They have steel surrounds. The Grafton inset fires have been specially designed

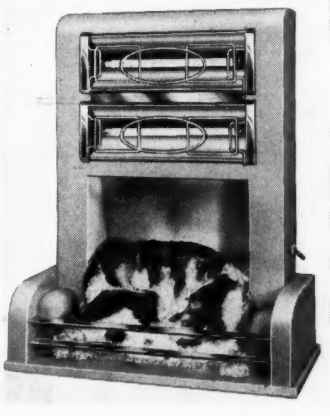


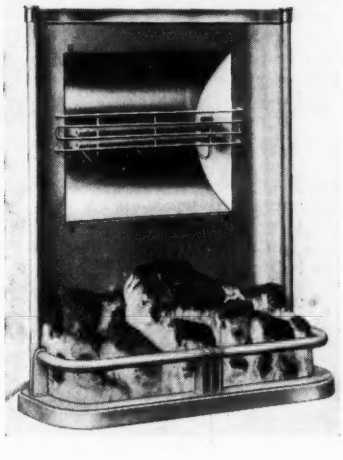


Left: Dowsing's Raeburn fire. Above: Two-bar "Haven" by Arora

for houses in which fireplaces have tiled or polished-plate surrounds. The Hart "Adaptable" is specially designed for fixing into walls or tiled surrounds. All the fires in a range by W. N. Froy & Co., Ltd., are chromium plated and are fitted with canopies. The "Swinton" No. 77 fire has a very wide trough in a "clean" and simple frame. Hotpoint describe their "Liberty" fire as "an exclusive circular inset flush-fitting fire of charm and originality." We agree. We like the pleasing "plaque" appearance of the Revo "Derwent" outset fire. A cast-iron surround houses one or two rod elements in separate chromium-plated troughs. The M.E.M. "Inset" is a flush-fitting cast-iron fire for mounting in a tiled surround or on a wall where a recess is provided. The "Mysto" 1191/1192 cast-iron fire can be adapted for either inset or outset purposes.

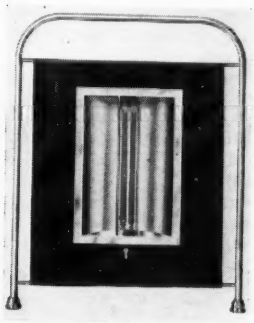
We are not at all clear as to what is meant nowadays by "panel" fires. In some cases we suspect that the term is used instead of inset or outset, but in any case there is a great similarity between them. "Creda" insert, semi-flat-back and flat-back panel fires all have the attractive but normal type of surrounds associated with wall fires. Insert models require a wall opening, semi-flat back fires need to be sunk only to plaster depth, and flat-back fires need no opening at all. Bratt Colbran "No. 153" equipment is described as having the electric radiator and wall panel in one casting. "Magi-panel" heaters and

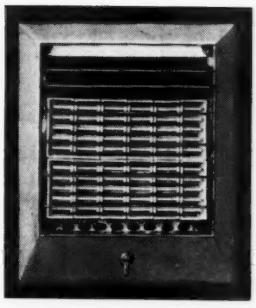




Above: "Apollo" by Falk Stadelmann. Right: The "Flamera set-in" (Ferranti)

"Magicoal" panel heaters (ordinary and imitation-fuel) each have a picture-frame type "panel" for wall mounting. In the "Magicoal" units the fuel is recessed within the frame above the heating elements. The tiled panel of the equipment by the Bell Fireplace Co., Ltd., provides an attractive setting in any colour to conform with existing or new decoration schemes, with a chromium surround. The panel fire of Joseph & Jesse Siddons, Ltd., is designed for perma-



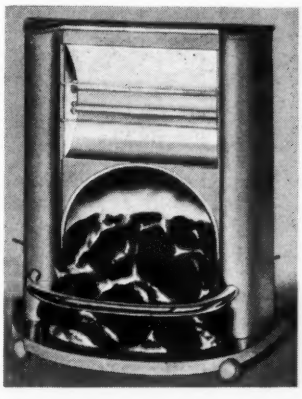


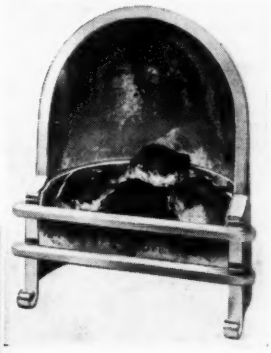
Left: A "Swinton" (Hattersley) screen inset. Above: The Hart "Adaptor" fire

nently fixing to a tiled surround; the panel is of heavy-gauge sheet-metal. Hotpoint's "Mountview" panel reflector fire is designed to stand in an open fireplace or surround. The vertical reflector has a surface of "trapezoidal" section, giving a wide diffused area of warmth. The Arora panel fire for insetting has a counterbalancing weight at the back.

No doubt the portability of the screen fire, rendering it suitable for general purpose work at times, is largely responsible for its gradually growing popularity. The Bank Hardware combined hearth firescreen and portable electric fire has a screen measuring 25 in. by 18 in. with a 1-kW central firebar. The plain surface has suitable relief at the top. The Swinton screen-type fire is provided with a loading of 2 kW in two vertical rod elements in a wide reflector. The Bulpitt "Kingston" fire will fit closely up to a fireplace and opening, entirely covering it.

The ease with which the reflector type fire can be wall mounted and focused as required accounts for its outstanding success for bathroom use. Generally two types are employed—one with a horizontal reflector trough and the other of the bowl-fire type. Among the former there is the Hotpoint "Perivale"





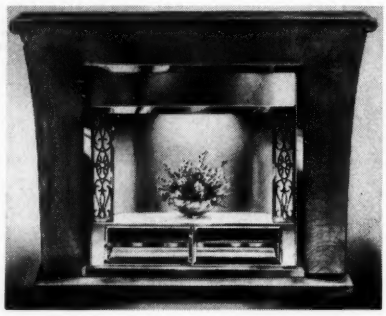
Left: Bellings "Princess" fire. Above: The Bratt Colbran "Sunrise"

which has a specially slotted pedestal base of pressed-steel and can be used for either floor or wall mounting. Another trough unit is the G.E.C. model "D2712," which, in the 2-kW size, is arranged for remote switching. The Eveson "Leda" is also designed for high mounting and control by a cord operated ceiling switch is recommended. Berry's "Peter Pan" is unusual in that it is of the box type with a recessed trough. It can be fixed at any angle and is intended to be controlled by a remote switch. The Carron "Radiant" is of the bowl-fire type and the novel and handy swivel mounting on the ceiling enables the user to turn the heat in any direction.

Rightly or wrongly the occasional introduction of fires designed to give utility service goes on. The "Carronaid" is a sheet-metal box-type fire with a 1-kW fire-bar at the front and another protected fire bar at the top. The top unit is intended for frying and boiling operations. The Belling "Utility" has a sloping front element and a horizontal one at the top at the foot of a hammered copper reflector. The Bank Hardware "E.A.1" portable fire is intended primarily for bedroom use. Cradled in arched end supports

the heating unit may be tilted and locked in any position, including the horizontal. The "Kingston" of Alneco is a box-type unit with three pairs of legs, four of which serve for upright use as a fire and four are used when the equipment is turned on its back. The "Angelus" hearth fire by Charles Joyner & Co., is a dual-purpose unit, but its major use is that of wholly covering the average domestic tiled fireplace. For portability it is fitted with adjustable back legs.

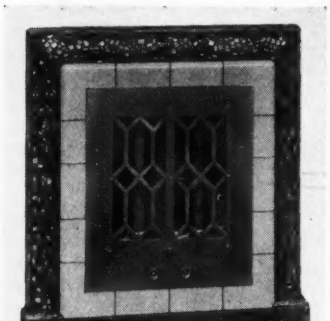
There is a tendency to introduce fires with the element units set in different planes, so that heat is projected in more than one direction. Most of these are of the narrow trough-reflector type and the Simplex "Kingston," the Bratt Colbran "Three Way" and the English Electric "Majestic" each have three vertical troughs with a central front unit parallel to the back of the fire and a unit on either side slightly offset to the back. Of particular interest in the "No. 773" Jackson is the three wide-angle trough reflectors all vertical and adjacent, the whole being arranged with a curved contour horizontally at the front of the troughs.



The Sylvanberry

Falk, Stadelmann's "Orion" has two vertical trough units set in a pillar type body and each unit slopes backwards towards the top, besides being set at a different angle horizontally to its neighbour. The "Cumberland" of Siemens Electric Lamps & Supplies, Ltd., is entirely different from the others described. The main body is a large vertically curved affair something like the older curved-back reflector fires. In the curved surface are set at different planes, so that projection is "inward" and not "outward," two horizontal trough reflector units. The upper element projects horizontally and the lower element slightly upwards. The Hotpoint "Mayfair" all-tile suite has three vertical reflector units arranged in a semi-circular formation horizontally, the whole being mounted on an illuminated tiled circular panel surrounded by a chromium-plated frame. The panel is pivoted so that the reflected heat can be directed to any part of the room.

There is no limit to the ingenuity of the designers of imitation-fuel fires. So far we have seen only one equipment of this class in which the source of heat is actually at the imitation-fuel position. Short elements are concealed behind the lumps of coal in the Bratt Colbran "Sunrise." Ferranti's "Flamera set-in" has a wide-angle reflector with two 1-kW rods recessed in a curved (horizontally) screen-type frame surmounting a single-bar fire-grate. Another wide-angle reflector unit is the Belling "Princess" (2 kW). Here also the heating unit is mounted above the fuel fire. This is slightly recessed into the body of the equipment which has two pillar-like sides. The "Justaberry" (Berry's Electric) is of the narrow-trough reflector type having two separately reflectored horizontal bars at the top and "coal" in an attractive fire grate at the bottom. Of similar construction is the C.W.S. "Grafton" which has beneath its two trough reflectors in the frame with side pillars a fire grate which slopes outward and downwards in curved formation. The British National "Talisman" has a semi-circular forward projection with widely spaced fire bars at the bottom. Two horizontal troughs are located in the frame at the top.



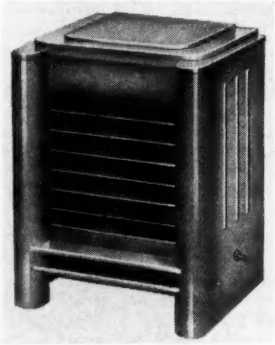
Bell panel fire with tiled surround

The "Mysto Sun-ray" has two vertically disposed horizontal troughs set in its marble slab body above a square open fireplace with front bars and side hobs. The Carron "Nelson" and the Premier "Cotswold" are examples of the "luxury" type of equipment. In each case there is a bottom fire with a front grate and extending side dogs. In the No. 1372 equipment by T. Price & Son, the fire is of the log variety and in the upward projecting back-piece there are two horizontal fire bars.

The rapid growth in the glow effect type of fire, *i.e.*, one in which light is introduced for "psychological" appeal, quite apart from imitation-fuel, during the last few years, has been truly remarkable, not only as regards numbers but also because of the many different ways of introducing the glow. To attempt to classify such effects, there is first the type in which the central glow is the major feature of the fire. The "Sylvanberry Junior," for instance, has in the main body a deeply recessed and illuminated reflectored flower-bowl chamber with artistic metal work at the sides. There is a wide horizontal trough reflector at the bottom. In the "Carrolite" there is a central wide trough reflector with a centrally disposed, concealed tubular lamp and in the two vertical wings of the body are vertical reflectored elements.

Then there is the class of equipment in which a pleasing floodlight effect is produced by flame lamps in a special surround at the back of the fire, and in this class we place the "Dunster" of W. T. French. Illuminated glass panels at the sides of the fire, as in the case of the new G.E.C. screen fire, represent another class. The Belling "Lounge" emits its cheerful glow from a grille arranged continuously around both sides and the top of the fire. In the Ferranti "Corona" there is a lamp behind semi-circular openings at the base, and light from this floods the surface of the fire body. In the Efesca "Mars" there are three copper louvres at the bottom between the stub legs. A glow from an amber lamp percolates through these.

The lighting fitting with incorporated heating such as the "Heatlite" pendant of Harcourts, Ltd., is another development which looks as though it has come to stay, although its field commercially is still small. The James Smellie "Tudor" grate fire, the Carron "Drake" and Berry's "Jacobean" are selections from the fairly wide range of attractive period equipment which is available. A novelty is represented by the plywood frames of fires by Mallinson & Eckersley, Ltd.



Above: The C.W.S. "Faneta." Below: Carron Company's convector

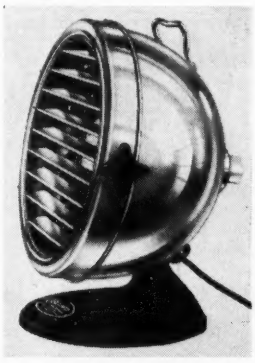
Merely because the original convectors introduced some years ago were definitely designed as equipment for low-temperature heating as a system it has been customary up to now to include all convectors under the heading of low-temperature heating equipment. We propose to discontinue this practice because of the tendency to introduce higher loadings and because it is so easy for the consumer to use the equipment on the high-temperature heating principle.

With a strictly neutral outlook, it is very interesting to make a comparison of the loadings, dimensions, &c., of a few convectors selected at random. The new Carron convector which has four 500-W clamped-type elements measures 28¼ in. high, 18⅝ in. wide and 8 in. deep. Eastwood's "Junior" convector, with a loading of 2 kW, is described as having a heating capacity of 2,000 cu. ft. Its dimensions are 30 in. high, 18 in. long and 8 in. wide. Heatrae have a convector which, in the 2-kW model measures 32 in. high, 29 in. wide and 7 in. deep. Multi-heat switching, according to the loads and with suitably disposed elements, may provide for either high-temperature or low-temperature heating at will. The No. 752 Belling can be switched for ½, 1 and 2 kW and it measures 37 in. wide, 24½ in. high and 8¾ in. deep. A new G.E.C. convector with a maximum loading of 1,500 W can also be switched for half-

load. An "Evenheat" model by Bratt Colbran can be loaded at either 1½ or 2 kW. The dissipation area of the heating unit has a relationship to the aspects referred to and British Trane Co., Ltd., stress the large heating surface of the element in the "Vectair" 1,000 sq. in. (1 kW).

Considerable attention is given to the housing of the heating unit in relation to the casing. In the J.P. convector an internal trumpet entirely insulates the outer casing. In the domestic "Thermovent" of E. K. Cole, Ltd., the metal convection unit proper, with its finned heating element, is quite independent of the bakelite outer casing which is actually carried by the heating unit. The Heatrae heating unit is completely enclosed and quite distinct from the outer casing.

Glow effects are also being introduced into convectors. In the "Efesca" convectors a cheerful glow is reflected from the internal upper baffle.

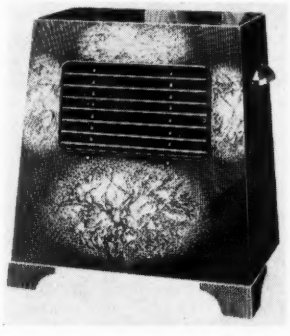


Collaro fan heater

which is bridged by horizontal bars. The Creda "Woodford" emits a pleasing glow effect from the top louvres which span the complete front of the convector. The Carron and Belling units referred to also have glow effects, and in C.W.S. convectors a concealed lamp throws a warm glow through the glazed panel at the bottom.

An example of the attention given to the direction of air flow from the convector is the "Vectair" arrangement. By means of the special grilles the warmed air is first directed downwards so that it flows well towards the centre of the room before it rises. The "Monarch" of W. T. French is a departure from the usual shape of box-type convector, being wider at the bottom. It is of sturdy heavy-sheet construction. The air heater by Vidor, Ltd., with its bright nickel-plated perforated cover (150 W, 12 in. long) may be included in the convector-type of equipment.

Fan heaters or forced-air circulators are generally still rather in the development stage. The "Midget" by Mather & Platt, Ltd., has a cylindrical cage-type body in which are the fan and fine-wire element. The element loading is about 1½ kW. The "Collaro" equipment is shaped like a bowl fire, an opening at the back providing the air inlet. The load is about 1½ kW and air direction is regulated by the shutters. The H.M.V. unit has specially shaped deflecting



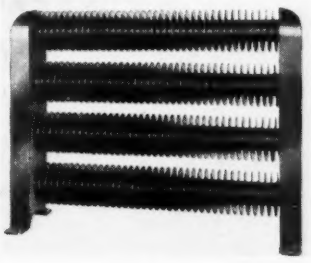
"Monarch" convector by W. T. French

louvres practically all round the heater proper (horizontally) so that the warm air flows in nearly every horizontal direction. The Belling equipment is rectangular and the "No. 73" model is switched for three heats—⅝, 1¼ and 2½ kW. Projection is through louvres. A "Universal" heater is circular with an extended base like a mantel clock. The loading is 1,320 W. In the perforated-end cylindrical model by S. Guiterman & Co., Ltd., a two-bladed fan drives air through element coils suspended on porcelain.

There is a tendency to develop tubular heaters as self-contained tiered units. A neat and substantial floor assembly is the Heatrae gilled-tube heater. A three-tier, 3-kW unit measures 16 in. high and 4 ft. 6 in. long. On the question of loading and capacity much the same can be said with regard to electric hot-water type radiators. The hot-water (completely water filled), "Electrovapour" (partly water filled) and "Electrovex" (waterless) equipments by Eastwoods are all loaded at 2 kW for the 2,000-cu. ft. size. The new electric hot-water radiator by Ideal Boilers and Radiators, Ltd., is loaded at 2,000 W for the 16-, 20-, and 24-section models which are 36, 30 and 24 in. high, respectively.

It is when we come to such a system as the "Health Ray" scheme of ceiling heating by Concealed Heating Co., Ltd., with its even distribution of low-temperature radiation over the ceiling surface, that we feel more free to refer to low-temperature heating. Wired plaster boards which are fixed either to the joists in a new building or superimposed upon the existing ceiling have special insulated conductors between aluminium-asbestos foil and the board proper. For a room 17 ft. by 12 ft. by 9 ft. a loading of 1¾ kW is recommended, with thermostatic control.

While low-temperature heating is gaining considerable ground with marked success in the commercial and industrial field, there is



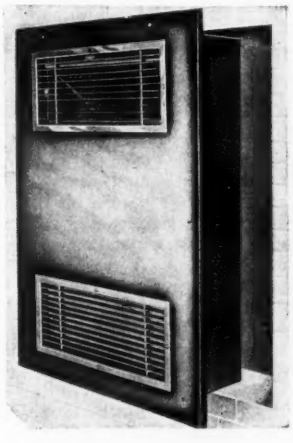
Heatrae gilled-tube air heater

still very little to show in the domestic field. Once again we repeat that this is a great pity, because it means that the electrical industry generally is not benefiting as it should from the unique inherent advantages offered by electric heating over other media. This idea is shared by electric heating engineers in this country and by many high-temperature fire manufacturers, for, after all, the conclusions are based upon simple scientific facts and practical experience.

Particulars of the space-heating equipment by Heatovent Electric, Ltd., have come to hand since the foregoing notes were written. Tubular heaters are produced in lengths from 2 to 20 ft. and in single-, double-, three- and four-tier formations. Standard loadings of 50, 60 and 70 W per foot are provided. A portable convector 30 in. high, 18 in. wide and 7½ in. deep is available with alternative loadings of 1, 1.5 and 2 kW. The case is of heavy-gauge sheet steel, with a polished hardwood top and wooden feet. A concealed lamp gives a glow effect. Thermostatically controlled and hand-controlled models are available, the latter being fitted with a two-heat switch.

British Trane convector

With similar internal arrangements there are models for recessing into walls, &c. The skeleton type comprises a sheet-steel slabbing box with the internal unit and the necessary inlet and outlet grilles. The flush model is of similar construction but has a detachable sheet-steel front panel, allowing for fixing and wiring. The semi-recessed unit has a front panel fitted with a wooden moulding to give any desired projection to 4 in. The loading is 2,000 W and the recess measures 27 in. high, 18 in. wide and 7¼ in. deep.



Heatovent convector

Under the recent Fuel and Lighting Order made by the Mines Department it will be necessary for domestic premises to reduce their consumption of electricity, coal and gas by 75 per cent. In this connection we strongly urge that due consideration should be given to the proved economic advantages of thermostatic control of electric heating. While such control has been advocated mainly for low-temperature heating there is no reason why under present conditions the thermostat should not be applied with advantage to the electric fire and other high-temperature equipment. Because of the ease and accuracy with which electric heating may be controlled automatically, as compared with other media, we believe that in many cases, under certain conditions, a change to electric heating will be found to be advisable purely from the point of view of economy.

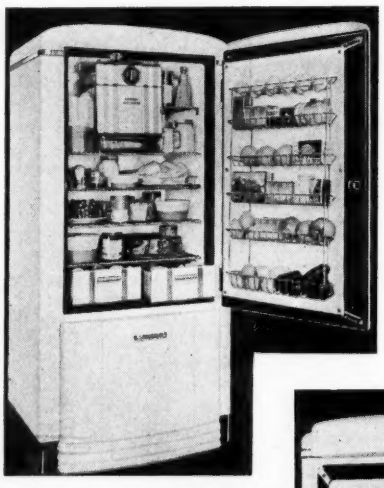
Domestic Refrigerators

PARTICULARS OF THE LATEST MODELS

IN the publicity material issued by Westinghouse Electric International Co. we notice a reference to the "harmful effects of kitchen warmth," and this prompts us to refer to the limitations often set for domestic refrigeration by those whose interest it is to broaden this promising field of business. We believe that seasonal campaigns are largely responsible for such limitation and that some supply undertakings and even refrigerator manufacturers are offenders. Refrigeration is definitely an all-the-year-round business because food begins to deteriorate immediately above 45 deg. F.

There is a tendency nowadays to replace the reciprocating-type compressor by rotary machines. The rolling action of the "Universal ice cycle system" of refrigeration by L. G. Hawkins & Co., Ltd., is said practically to eliminate friction. In the Grunow refrigerating unit by Rotapex, Ltd., there is only one major moving part in the entire refrigerating system. In equipment by Sears, Roebuck & Co., Ltd., the compressor unit with only five moving parts is sealed in a bath of oil.

B.T.H. WB-10 wood-case (International Co.) cabinet



Crosley-Shelvador BH 80 model

Increasing attention is being given to protection of the compressor equipment. The "Crosley Shelvador" table top refrigerator by A. J. Balcombe, Ltd., incorporates the latest Crosley hermetically sealed unit. In equipments by International Refrigerator Co., Ltd., the entire refrigerating mechanism is enclosed in a welded steel case protected from the deteriorating effects of air, dirt and moisture. The following are two examples of the tendency to introduce special refrigerants. "Carrene" used in the Grunow equipments is said to be safe to handle and to smell without danger or inconvenience. "Freon 114" as used by Frigidaire, Ltd., is said to be non-explosive, non-inflammable, non-poisonous, non-corrosive and non-injurious to foodstuffs.

Compressor motors generally are standard. In the "Coldair" 3.23-cu. ft. refrigerator by the General Electric Co., Ltd., the motor is of ⅛ HP and runs at 1,425/1,450 RPM. The average starting current is 7.8 A. The motor in equipments by Marco Refrigerators, Ltd., is fitted with an overload relay, and as a protection against the motor starting under heavy load in B.T.H. equipments there is an oil-pressure operated unloader which ensures that oil under pressure reaches all moving parts before the load is placed on the compressor.

As examples of the consideration given to rendering refrigerators vibrationless we cite the equipment by Vactric, Ltd., in which the large quiet power unit in the bottom of the cabinet floats on springs and rubber, and the "Prestcold" built-in refrigerator of the Pressed Steel Co., Ltd., in which the ⅛-HP single-cylinder machine is suspended for silent operation on calibrated springs and anti-vibration rubber mountings.

It is difficult to draw a line between domestic and commercial refrigerators, but we believe that very roughly the following three groups of sizes represent fairly well-marked fields of development in respect of classes of houses in which they are installed—below 4 cu. ft., 4 to 6 cu. ft. and 6 to 8 cu. ft. The main interest in connection with the smallest group at any rate is the external dimensions in relation to the storage capacity, because of the limited space in the kitchens of small houses. The figures given for the following models are height, width and depth, respectively. Sears, Roebuck 3.95 cu. ft., 41½ in., 23⅞ in. and 22 in.; H.M.V. Household Appliances 3.25 cu. ft., 46½ in., 24¼ in., and 20⅛ in.; Electrical Commodities, Ltd., 2.25 cu. ft., 36 in., 20 in., and 20 in.; "Prestcold" 3.6 cu. ft., 48¼ in., 29⅜ in. and 18$\frac{7}{16}$ in. In the following we give the shelf areas for various models in the same groups. Frigidaire 3 cu. ft., 6.5 sq. ft.; Kelvinator, Ltd., 3.16 cu. ft., 7.45 sq. ft.; Westinghouse 3.25 cu. ft., 6.23 sq. ft.; G.E.C. 3.23 cu. ft., 5.9 sq. ft.

Century 4.5 cu. ft. standard refrigerator

In the following we give the shelf areas of some selections from the two larger groups: Hawkins 5 cu. ft., 11 sq. ft.; Vactric 6.65 cu. ft., 15.6 sq. ft.; Marco 4.5 cu. ft., 10 sq. ft.; Century Refrigeration (1938), Ltd., 4.5 cu. ft., 8 sq. ft.; Rotapex 6.7 cu. ft., 14.3 sq. ft.; Balcombe 8 cu. ft., 17.73 sq. ft.; B.T.H. 8.1 cu. ft., 16.9 sq. ft.

Developments in kitchen planning are still rather disappointing, but the idea is sound and credit is due to those manufacturers who are helping the movement by the provision of built-in equipments. The "Prestcold" model 371B has been specially designed for easy application as a built-in unit, it measures 48¼ in. high, 29⅜ in. wide and 18$\frac{7}{16}$ in. deep and has a food storage capacity of 3.6 cu. ft. and a shelf area of 8.6 sq. ft.

Cabinets with exteriors other than enamelled sheet-steel are rare in the domestic type of equipment, so that the wooden case of the new W.B. 10 B.T.H. refrigerator is of particular interest, although with a capacity of 10 cu. ft. this unit will no doubt make inroads into the commercial field. The exterior is polished veneered oak.

The provision of an interior light which is switched on automatically when the door is opened is a popular feature nowadays, and the following are among the makers who provide this gadget: Hawkins, Vactric, Balcombe, Pressed Steel and Fridigaire.

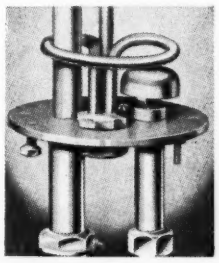
"Master 3" cabinet by Frigidaire

Temperature control is, of course, all-important and a number of makers provide multiple control. The Westinghouse "True Temp" automatically maintains selected refrigerator temperature, irrespective of outside conditions. Automatic twelve-point temperature control is a feature of the Century equipments. Rubber ice trays are a speciality of the India Rubber, Gutta Percha & Telegraph Works Co., Ltd.

Water Heaters

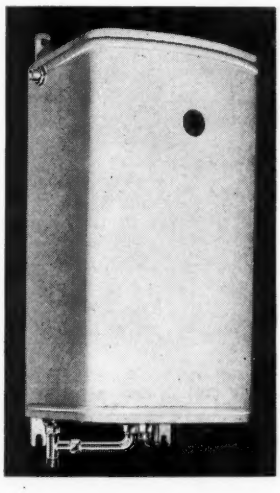
SCALE FORMATION IS A PROBLEM DEALT WITH IN SEVERAL OF THE LATEST DESIGNS

THE fight against scale formation in water heaters for service in hard-water districts still goes on and the latest development seems to open up a new line of thought in opposition to low watts density as an anti-furring measure. We refer to the element in the new "Creda" water heater of the Simplex Electric Co., Ltd. It is comparatively short, of the tubular sheathed type and mounted horizontally about 1 in. above the apparatus plate. It is claimed that by increasing the watts density hard-grained scale is avoided and that the precipitate is finely divided and carried away in suspension through the outlet pipe. Because the element is remote from the anti-drip syphon cap this is also free from scaling. As the heating source is at one level only, the water does not impinge against the heat dissipation surface as it rises to the top of the inner container.



The new Creda element with increased watts density

Santon, Ltd., claim that the main source of trouble in hard-water districts is the over-heated element, and that this has been overcome by the provision of a large wetted area with a very low heat density surface, a combination which resists the formation of scale. Serious scale collection at the interior outlet is prevented by a much enlarged outlet and the absence of a syphon cap. The three short vertical heating elements for bottom heating in the domestic storage equipments of A. Reyrolle & Co., Ltd., have a low surface-dissipation rating of 9.5 W per sq. in.



Thermics dual-purpose water heater

In the new "Star" 1½- and 3-gal. water heaters by Aidas, Ltd., the flow tube inside the heater is always covered with water and never allowed to work dry, so that fur does not easily collect and a good deal of it is washed off when hot water is drawn. The straight delivery pipe has a wide bore and is without a syphon cap. The company claims that 60 per cent. of maintenance costs on free-outlet water heaters is due to the renewal of worn tap washers. In the "Star" heaters the washers are closed by springs with always the same pressure and always in the same place. The spring-loaded valves on the inlet and outlet valves are mounted side by side and operated by a single handle.

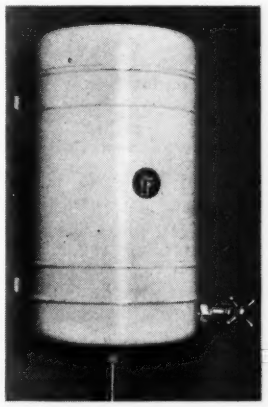
The principle of the "Densacone" anti-scaling arrangement employed in the water heaters of Drake & Gorham Wholesale, Ltd., is that the elements and thermostat are always immersed in the distilled water in the heating chamber. The water level in the main container is kept below the top of the heating chamber and water from both the container and the chamber is condensed on an inverted cone at the top of the container interior. The condensate drips into the heating chamber. The 1½-gal. non-pressure wall-mounting water heater by Eltron (London), Ltd., is fitted with a ring type element. This arrangement is recommended for hard-water districts as any scale formed flakes off and falls to the bottom of the container.

Maintenance costs still greatly concern the supply undertaking which hires out water heaters, so that any aid to easy cleaning is of importance. Such a contribution by Johnson & Phillips, Ltd., is the outlet-pipe scheme of the new "Charlton" top-outlet heater. The pipe is carried away from the upper part of the water container and is fitted with a coupling to which a chromium plated drop-pipe is fixed. The "drop" can be arranged either at the right-hand or the left-hand side of the heater and it is supported near the bottom by a bracket fixed to the casing. The pipe has a large bore and clean run so that fur can be broken away without emptying the heater.

A new 1½-gal. sink heater by Thermics, Ltd., which has been specially designed to facilitate maintenance and to reduce external dimensions also appears to be of the top-outlet type. A swan-neck spout leaves the heater at about two-thirds up the case. The loading is 850 W. A new 1½-gal. water heater by Ferranti, Ltd., which has been specially designed for hard-water areas has a withdrawable hot-water outlet pipe.

In the new constant hot water unit by the Hotpoint Electric Appliance Co., Ltd., we approach the geyser principle. With a loading of 4 kW this small-diameter cylindrical unit has quite a small holding capacity as will be seen from the fact that it will provide about 2½ pints of water per minute at 130 deg. F.

The "Rapid" water heater by Archibald Low Electrics, Ltd., with a capacity of 1 gal. and a loading of 3 kW, is designed to give small quantities of hot water quickly. The "Looprod" type element is controlled by a thermostat. A control valve, pressure reducing valve and non-return arrangement are provided on the cold-water inlet. One gallon of water is raised from 50 deg. F. to 150 deg. F. in 7 min. The "Quick Service" heater by Falk, Stadelmann & Co., Ltd., has a capacity of 12 gal. and a loading of 4 kW. It is designed for manual control by a three-heat switch. A 20-in. circulator is fitted vertically from the bottom and the heater has a ¾-in. inlet pipe with a stop-valve, a ¾-in. outlet pipe with an anti-syphon cap and a swivel swan-neck spout. The Geyser Manufacturing Co. (1932), Ltd., is responsible for a range of high-load unlagged heaters in circular, D-shaped and angle patterns. The 3- and 5½-gal. circular heaters are loaded at 2 kW and the 9- and 12-gal. sizes in all three patterns are loaded at 3 kW and 4 kW, respectively.



Heatrae XXX unlagged heater

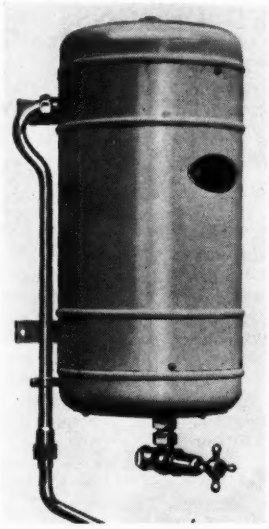
Two dual-purpose water heaters for quick heating and general service have appeared on the market. The "Heatrae XXX" unlagged equipment by Heatrae, Ltd., has been specially designed for use in artisan flats. It will give small quantities of hot water very quickly after switching on because the full loading (15 A) is applied to a 1½-gal. isolated inner chamber.

Reyrolle 1½-gal. equipment, with low surface dissipation elements

For bath use a valve is opened which connects the outlet from the inner vessel to the top of the 12-gal. main water chamber. The cold-water feed from the supply tank is connected to the outer-water chamber. When the bath-heating valve is opened circulation takes place, the hot-water belt in the outer chamber travelling from top to bottom. The result is that after 10 to 20 minutes a quantity of hot water can be drawn off according to the time the switch is left on with the bath valve open. The Thermics dual-purpose heater consists of a

small lagged heater for sink service inside a larger container for bath service. When hot water is drawn off from the small heater it is replaced by water from the large container which absorbs the heat losses from the small heater, thereby greatly reducing the total heat wasted. The 3-kW element is thermostatically controlled.

Bearing on the load and capacity question it is well to review a few of the orthodox type storage heaters. The English Electric Co., Ltd., has four ranges—non-pressure for kitchen sink service (1½-gal. and 3-gal.), non-pressure for bathroom service (5-, 12-, 15- and 20-gal.), pressure types from 5 to 20 gal. for multi-tap use and the cistern type in 5 to 20 gal. sizes for general use. The non-pressure types may be connected direct to the water mains, the pressure units may be connected to an existing ball-valve feed tank and the cistern type incorporates a separate self-contained ball-valve tank. The 5-gal. heaters of all



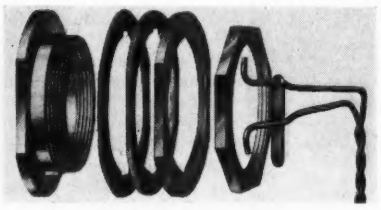
Top outlet heater by Johnson & Phillips

classes are loaded at 1 kW and the 20-gal. models at 2 kW. The 1½-gal. unit is loaded at 750 W and the 3-gal. unit at 1 kW.

The 1½-, 3-, 5-, 12- and 15-gal. non-pressure storage heaters of the General Electric Co., Ltd., are loaded at 750, 1,000, 1,000, 1,500 and 1,500 W, respectively. The 12-, 15-, 20- and 30-gal. pressure equipments are loaded at 1,500, 1,500, 2,000 and 3,000 W, respectively, and similar loadings are employed for cistern type heaters.

We believe that immersion heaters and circulators for conversion work still have the "pull" in the water-heating equipment business, but technically there have been very few major developments in this field of late. Santon state that there is a heater for every conceivable demand, covering internal and external circulators, immersion heaters and belt heaters, each serving a particular purpose, whether principally top heat or combined with general heat or mainly general heat. Generally speaking, a quick top heat with an ultimate general heat best meets the biggest demand. We are glad to learn that the "Highlow" top-entry immersion heater with concentrated heat at the bottom has proved a success.

Easy wiring and fixing of immersion heaters is of great importance from the maintenance viewpoint. Geo. Bray & Co., Ltd., have introduced for immersion heaters and circulators a small bakelite cover which can be removed for connection purposes without disturbing the main cover. Another development by the company is a special boltless cylinder fixed without sweating by means of a special handle. The flange connector by Siemens Electric Lamps and Supplies, Ltd., is made in two types—three-way and one-way. The former provides three fixing positions in one unit — an ideal arrangement for the fitting of an immersion heater, thermostat and draw-off cock in the conversion of water tanks to electric heating. The one-way type is suitable for an immersion heater only or for pipe connections, draincocks, etc.



George Bray boltless flange

The "Dragor" immersion heater fixing flange has a spigot flange with a V slot. The flange is placed so that the tank side at the hole is sandwiched in the V slot, thus enabling the flange to be passed through the hole and positioned inside the tank. Whilst it is held by a wire over which the outer nut and washer are slipped, the hole is tightened up ready for reception of the immersion heater. A "Dragor" immersion heater can be quickly converted to a circulator by three clips and three curved blades which afford circulation like the fixed tube, with the advantage afforded by quick removal for cleaning.

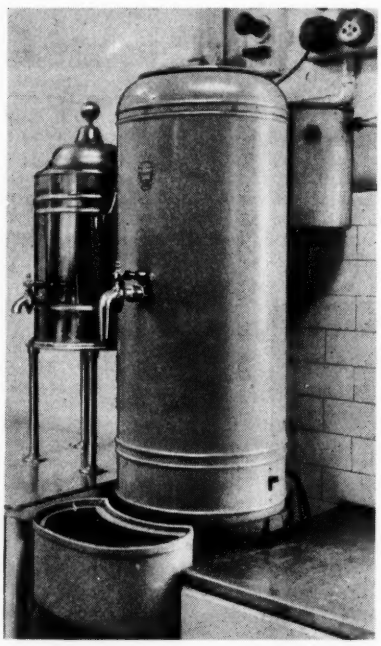
Principle of design rather than application is the reason for including hot-water boilers in the water-heating section. The Ferranti boiler is fitted with two separate sets of elements —storage 3 kW and delivery 4½ kW—but only one set can be in operation at one time. The storage elements are thermostatically controlled and maintain the water in the main reservoir at 20 to 30 deg. F. below boiling point. A single movement of the switch cuts out the storage elements and puts the delivery elements in circuit, thus bringing the water to boiling point immediately. Forty pints of freshly boiled water can be delivered in eight minutes.

The treatment of central hot water supply systems for blocks of flats is always a little difficult because, although the application is essentially domestic, the equipment used is of the heavy-duty or commercial type.

We learn that Bastian & Allen, Ltd., have recently introduced such a system for which it is claimed that while supplying hot water instantaneously at high temperature, circulating losses are reduced to a very low figure. The system is designed so that the main heating load is in use only during the off-peak period.

Experience shows that the average quantity of hot water at 160 deg. F. drawn off each day in a working-class flat of two or three rooms is approximately 25 gal., and this figure is increased to 40 or 50 gal. per day in high-class flats with three or four rooms.

Due consideration of the circumstances obtaining in a particular block of flats enables the size of storage to be obtained and this storage is provided by means of a storage tank of suitable dimensions which is installed preferably in the roof space or tank room above the highest point of draw-off. This tank can be either rectangular or cylindrical and is fitted with immersion heater elements of suitable rating, or alternatively in some instances it might be preferable to utilise a separate boiler, heating the tank



Ferranti water boiler

indirectly by means of a hot water heating coil or exchanger.

The rating of the immersion heaters fitted to the tank should be such that a reasonably rapid rate of re-heating is provided for the storage in order that heavy demands which may occur immediately after the conclusion of the peak period of the electricity supply when the storage tank may be expected to be exhausted, can be successfully dealt with.

The cold water supply to the storage tank is arranged in a special manner as follows. A small ball-valve cold-water cistern is provided, which is fed from the main cold water supply. From this cistern a cold-water feed pipe is taken to the main storage tank, the position of the cold water cistern being arranged so that the high-water level in the storage tank is maintained without the necessity of employing a second ball valve in the storage tank itself. A valve capable of being regulated by hand is inserted in the cold feed line from the cold water cistern to the storage tank so that the rate of entry of cold water into the storage tank can be adjusted and water entering the storage tank is immediately heated to the maximum storage temperature of, say, 160 deg. F.

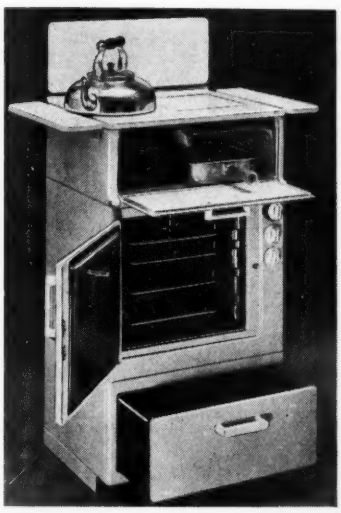
The hot water system supplying the various flats is divided into sections, the number depending upon the particular disposition and layout of the building. In one section supplying hot water to one flat on each floor the pipework takes the form of a loop, the rising leg supplying the bath and basin in each flat, the other leg supplying the kitchen sink. In a second section supplying two flats on each floor the pipework is again formed as a loop, the rising leg supplying the sink, basin and bath of one flat on each floor, the other leg of the loop supplying the bath, basin and sink of the second flat. Each of these loops is connected to the bottom of the storage tank by means of a single pipe-line.

Cooking Apparatus

TREND OF DEVELOPMENT

SOME people, including many connected with supply undertakings, seem to have the idea that the new restrictions relating to fuel mean an automatic standstill of the development of electric cooking. This is quite wrong. The liberty of householders to choose their method of cooking is not interfered with in any way and there still remain the same cogent arguments of efficiency, cleanliness and economy in favour of electricity.

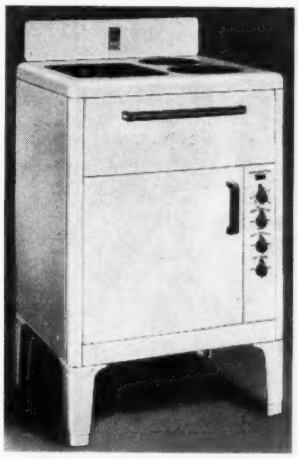
War or no war, we still have to eat and we should say that of electricity and gas, the former offers the most scope for effecting economies owing to the very high standard of lagging adopted for electric ovens. This results in low heat loss and a very useful residual heat which can be employed for cooking purposes long after the elements have been switched off. It seems unlikely that housewives will feel inclined to cut down their cooking to any great extent. They well probably endeavour to save electricity by more careful use of fires and water heaters. By using a little common-sense and forethought in the operation of the cooker it is, however, possible for quite a substantial saving in electricity consumption to be made without reducing the amount of the food dealt with. This point is dealt with in the article in this issue by Miss Caroline Haslett, director of the E.A.W.

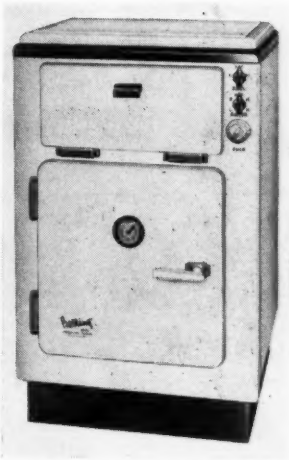


Above and right : Two forms of the Jackson " 192J "

Cooking from cold, favoured by Hotpoint and others for some time, looks as though it may at last come into its own, in view of the fact that the heating-up period is thereby utilised. A more careful watch too might be kept on the thermometer and the switch put to "low" or "off" more promptly. Overheating should in any case be avoided and in this respect much assistance is forthcoming from thermostatic, or as it is now more commonly called automatic, oven control. This useful device, looked at askance by many manufacturers two or three years ago, has without question now proved its worth not only for economy's sake but also for ensuring more consistently good cooking. Doubts regarding the reliability and life of the thermostats have been emphatically dispelled, and it is actually found that maintenance costs generally are reduced owing to the impossibility of overheating. As a result of this, manufacturers are producing an increased number of models with automatic control more or less as standard and we believe we are correct in saying that there is no standard cooker made to-day that can not readily be fitted with the device. So large a demand have Simplex had for this new facility that almost 40 per cent. of their cookers have "Credastats."

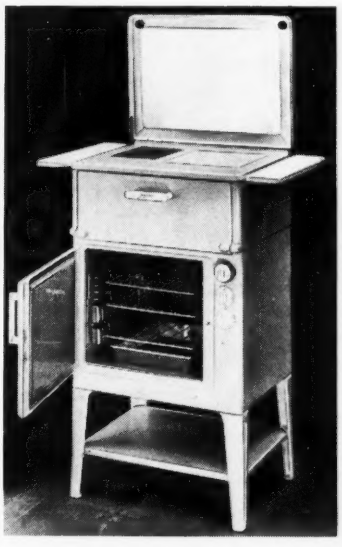
English Electric " H.C.212 " fitted with " Ritemp " control

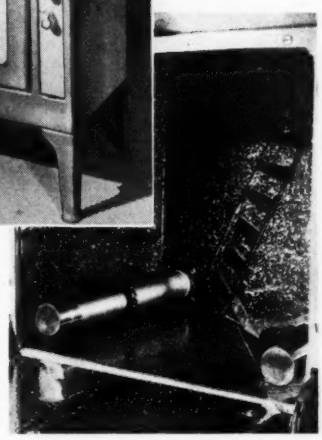




Belling " 63A " and (left) G.E.C. " D.C.105 "

Apart from the increasing adoption of automatic oven control the most striking feature of cooker development during the past few months is the extension of the use of "streamlining" from the de luxe class to the standard range of apparatus and four manufacturers at least have introduced new models incorporating this refinement. Prices are so slightly above those of the ordinary standard models that most undertakings will no doubt think it worth while to pay the little extra and have apparatus of the most up-to-date type. The G.E.C. has just brought out a larger edition of its "D.C.100," the "D.C.105," with more oven space, an extra hot plate and an exceptionally large grill boiler, measuring 12 in. by 10 in.

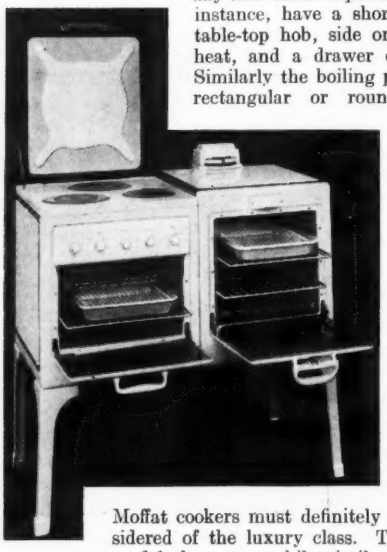




Moffat " 142 " showing (right) the tubular elements situated at the bottom corners

and loaded at 2,700 W. Contrary to recent practice the boiling plates (1,200-W, 7-in. and 1,800-W, 8-in.) are situated on the right of the hob. The oven is arranged for side and bottom heat with a removable interior.

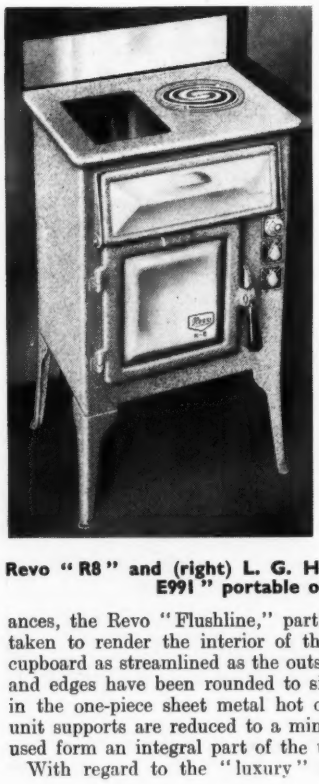
The second of these streamline, or "Cleanline" cookers, as the makers prefer to call it, is the Jackson "192 J," the ingenious design of which makes it possible to be adapted to suit any individual requirements. It can, for instance, have a short splashplate or a table-top hob, side or side and bottom heat, and a drawer or legs and shelf. Similarly the boiling plate can be either rectangular or round and either a



Moffat "31-Q-G" (left)

Backer-Jackson "Simme-radiant" four-heat unit or an enclosed three-heat plate.

Hitherto Moffat cookers must definitely have been considered of the luxury class. The new "142" model, however, while similar in appearance and general construction to previous cookers, has been designed especially for hire purposes, and is available at a remarkably low price. An especially interesting feature is that the oven is heated by two 800-W 12-in. long "Inconel" tubular elements situated at the bottom corners. This is a departure from the previous practice peculiar to Moffats (for standard sized cookers), of having the elements at the top. The oven itself is welded in one piece and the rack supports and baffle are removable for cleaning. Although on account of cost the attractive colour finishes of the previous models are not applied, the mottled grey and white porce-

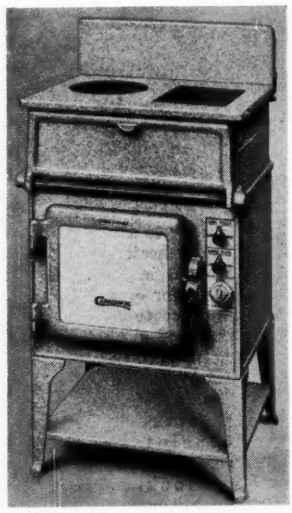


Revo "R8" and (right) L. G. Hawkins "Universal E991" portable oven

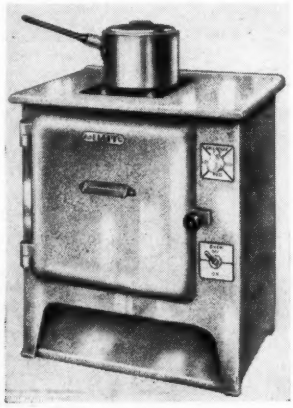
lain offers equal protection to the metal.

In the most recent of these streamline appliances, the Revo "Flushline," particular care has been taken to render the interior of the oven and the hot cupboard as streamlined as the outside. All the corners and edges have been rounded to simplify cleaning and in the one-piece sheet metal hot cupboard the boiling unit supports are reduced to a minimum and wherever used form an integral part of the unit.

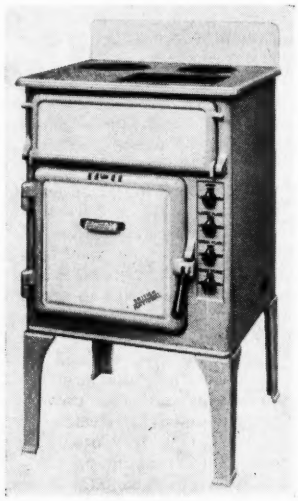
With regard to the "luxury" class of streamlined cookers, perhaps the most interesting innovation is the marketing by Hotpoint of a complete new range of Canadian models. In common with Hawkins "Universal" cookers they are distinguished by the incorporation of large heated hotcupboards with drop-down doors, the arrangement of the switches horizontally, the absence



The "Carronade" (right)



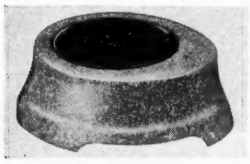
Revo "Dinkie"

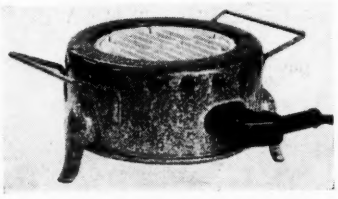


B.N.E. "C.26"

of a grill-boiler, and occasionally, the use of time control. A glass inner door with foot control is an exclusive feature of the Belling models, while Moffats have brought out a new version of the "31-Q," the "31-Q-G," with a separate grill compartment instead of a warming oven. The grill-boiler is dispensed with in the Revo "R75" and instead a separate griller is provided. In all these cookers a plain white finish is general practice. An extension of the streamlining idea is to be found in the vogue for built-in kitchen equipment in which Easiwork, Ltd., are specialists.

Though the English Electric Co. has not brought out any specifically streamlined models its existing standard cookers actually have very few ridges and projections, and the use of specially designed knobs helps to create the impression of streamlining. Incidentally these cookers are now available in two-tone ivory and green and cream, in addition to mottled grey. Siemens, too, are now supplying their standard cookers in the same colours. Even heat distribution through the oven is a special feature of the "Carronade" made possible by the use of special bottom trays, which can be removed if necessary to increase oven capacity. In some of the "Creda" models the insides are removable in three sections for cleaning.



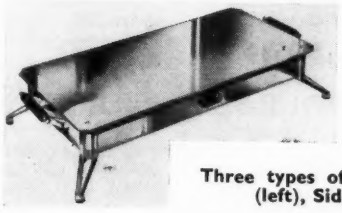


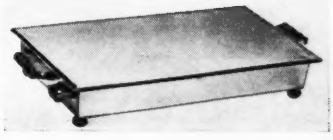
Hattersley "Swinton" and (right) Eveson portable hotplates

Since the introduction of the Backer-Jackson radiant solid plate, there has been no major development in hotplates. Nor has much progress been made with the general adoption either of infinitely variable control of hot-plates as offered by the Sunvic device, or of the ten-heat "Lokost" system which Tricity Cookers have brought out. Manufacturers are apparently chary about adding another refinement and additional cost at the present stage of development. Regarding the use of solid plates, is it generally appreciated that special flat-bottomed

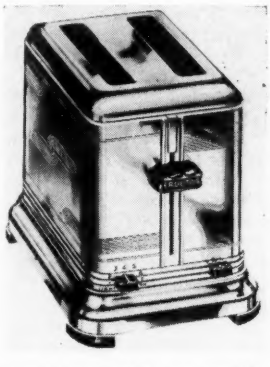
English Electric "H.C.25" breakfast cooker

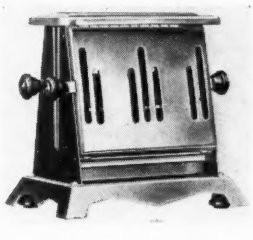
utensils not only reduce coiling times and electricity consumption (a matter of particular importance now) but also lengthen the life of the plates due to the elimination of hot-spots? Even when radiant plates are used the grill-boiler is nearly always of the solid type requiring special utensils for most efficient operation. This seems to indicate that there might well be a more general use of such utensils as those marketed by Bulpitt & Sons, Corfield-Sigg, Pinchbeck, Buncher & Haseler, Ernest Stevens, the London Aluminium Co., and others. Transformer plates, as supplied by Revo, British





Three types of warming plate made by Dowsing (left), Siddons (right) and S.L.R. (below)



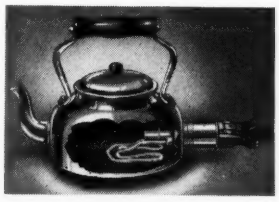


Toubkin double automatic Proctor toaster and (right) the Siemens "H.400" model

National Electrics and Creda, are favoured by certain undertakings.

For flats, &c., there is still a considerable demand for "baby" cookers such as the Siemens "Minor," the "Carronette," the B.N.E. "Modernette" with the optional reflector fire in the base, the English Electric "H.C.210," the "Baby Belling," the Revo

Right: Best immersion kettle element. Below: Bray kettle cut away to show element



"Dinkie," the Falk Stadelmann "Senior Flatlet," and the Hattersley "Swinton O/27," and there is no diminution in the popularity of breakfast cookers. Manufacturers of these include B.N.E., Hotpoint, Vidor, Siemens, English Electric, Creda, Hattersley, Belling, Carron and the C.W.S. (Dudley-Electric). The Siemens model has been slightly enlarged, while the English Electric units are now available in mottled finishes.

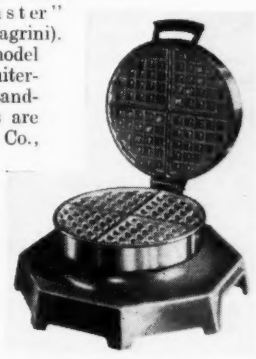
Apart from the now well-known Stokes, H.M.V. Household Appliances and the London Aluminium "Diamond" table cookers, L. G. Hawkins have a novel three-heat three-tier unit, combining a grill, a toaster, chafing dish and a double boiler. The same company also supplies a small thermostatically controlled portable oven and various types of hotplates. Hotplates and boiling rings are also marketed by the Dominion Electrical Co., Bertram Thomas, Guiterman, Premier, Hattersley, the C.W.S., Hotpoint, Eveson, Falk Stadelmann, Elco and many others.

Electric food servers, warmers, &c., are products of Stokes Appliances, S.L.R., Siddons, Dowsing, A. D. Davidson, L. G. Hawkins and Bertram Thomas, the last-mentioned company also specialising in electrical buffets comprising a dinner wagon, hotplate carving table, hot cupboard and extra plugs for kettles, toasters, &c.

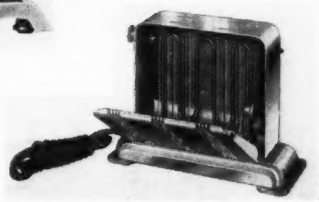
A few makers announce modifications of their toaster designs. Falk, Stadelmann, for instance, have completely redesigned their models on the streamline pattern and alternative types are available with "Backer" tubular elements and the usual mica elements. Alterations are also being made in the design of the "Toastmaster" toaster (Magrini).

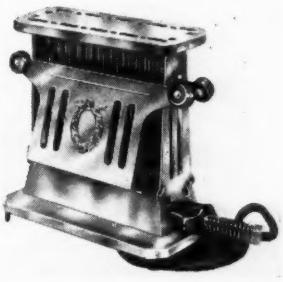
A double automatic "Proctor" model is marketed by Toubkin, while Guiterman list among their products a sandwich grill. Other toaster makers are L. G. Hawkins, Grafton Heater Co., Hotpoint, Pye, Siemens, Alneco, Revo, French, Premier, Ormond and A. C. Gilbert. Waffle irons are obtainable from W. T. Henley's and Hawkins.

A 3-pint 1-kW safety kettle marketed by L. G. Hawkins is one of the few recent kettle



Henley waffle iron, a Falk Stadelmann toaster (left) with tubular elements, and (below) a Revo toaster





developments. Best Products have produced a new immersion type elements with a safety device which will be incorporated in all the company's kettles in the future. The safety device of a Premier "Pylon" kettle in circuit with no water inside is claimed to have been operated over 70,000 times and to be still going strong.

The idea of having no legs on the "Creda" fast boiling kettle (1,500 W) in order that it might be used on a hotplate for extra fast boiling did not, after all, meet with general approval, the boiling times being considered quite fast enough without further assistance. Accordingly the latest model is fitted with legs unless specified. A loading of 2 kW is apparently considered the maximum necessary or desirable for a 3-pint kettle and, used by the G.E.C. in one of their models, gives exceptionally fast boiling times, a feature, too, of the Bulpitt kettles and London Aluminium Co.'s "Diamond," both loaded at 1,800 W. Falk, Stadelmann and Corfield-Sigg both report a satisfactory demand for the "No. 519" kettle marketed jointly and fitted with a "Backer" radiant element. Hotpoint, T. Price, Siemens, Grafton Heater Co., Revo, Eveson, W. T. French, Bray, the C.W.S., and Buncher & Haseler all market kettles of up-to-date design.

An alternative method of heating water, &c., is offered by the Eltron "Combinax" immersion heater. Special saucepans for boiling milk, &c., are made by, among others, Grafton, Siemens, C.W.S. and Falk, Stadelmann. Hotpoint have a hot water jug which boils three pints in six minutes. Coffee percolators in attractive designs are available from Pye, Toubkin, Rotapex, Falk Stadelmann, Guiterman, Grafton, L. G. Hawkins, &c. Cooking apparatus of all kinds is obtainable from the G.E.C., the Sun Electrical Co., and Superlamp, Ltd.

A Pye percolator

Home Laundry

A SURVEY OF MODERN LABOUR-SAVING EQUIPMENT

TYPICAL of the ease with which modern household clothes washers can be operated is the G.E.C. machine, which has only two controls, one for setting the agitator in motion while the other operates the overhanging swivel wringer. The mechanism for both is totally enclosed and driven by a single 250-W motor. The wringer may be lifted off and replaced by a "Genalex" roll ironer, driven by the same motor and controlled by a convenient lever. The electrically heated shoe (1,000 W) has a separate switch and pilot lamp and maintains a constant pressure whatever the type of material being ironed or pressed. There is a similar "Genalex" ironer of the table type with a total loading of 1,250 W. The motor is of one-sixth horse-power and knee control is provided.

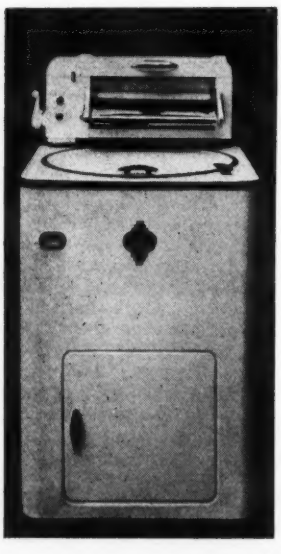
The Wilkins and Mitchell "Servis" is claimed by the manufacturers to be the first English-made cabinet washer. The wringer has an additional release and the tub is pressed out of one sheet without joints or welds. The Crompton Parkinson motor drives through a V-belt and the centrifugal pump is made of zinc alloy that is not affected by chemical washing solutions. The "Siroma" (formerly A. Morris & Co.), is of inexpensive design and 200 W loading. It is of 10 gal. capacity, or 5.5 lb. of dry clothes. The tub diameter is 18 in. and the overall height is 32 in. (40 in. with hand-operated wringer attached).

Besides the well-known "Hotpoint" of B.T.H. make there is now a cabinet style. The wringer can be stowed in a cupboard in the base when not in use, or interchanged with a rotary ironer attachment. There is also an AC table ironer of convenient non-rotary type which serves equally well for pressing suits, costumes and coats. It is thermostatically controlled by two switches and the 1,350-W shoe is actuated by a lever, exerting a pressure of 300 lb. over the 266 sq. in. of pressing area.

An electrically welded frame is a feature of the Electrical Components machine

The moderately priced American-made "Handee" roll ironer (H. & D., Ltd.), is portable for use on any ordinary table, the metal base having a rubber sole. In several respects the "Cotto" is unconventional; it is believed to be the only washer without agitator mechanism built into the tank. An inverted V-sectioned paddle is actuated by a patented cam from above and is lifted out of the tub when the lid is opened, thus leaving the interior free of obstructions. It is fitted with a power or hand wringer, and is heated by Bray "Chromalox" elements of 850 W each which are independently switched according to number.

There are five Toubkin washers of "Blackstone" design, a draining pump and DC driving motor being obtainable as extras. The capacities range from 20 to 26 gal. or 7 to 9 lb. of dry clothes, and a Lovell wringer is fitted. The largest model has twin tubs, so that while one batch of clothes is being washed another can be rinsed and damp-dried in a perforated stainless steel spinner basket. This concern's cabinet type roll ironers have two end shelves on which to fold garments, and a table top.



The Wilkins and Mitchell "Servis" is claimed to be the first English-made cabinet model

In the Hawkins "Universal" range are twin-tub centrifugal dryer-washers with a self-emptying pump fitted with a silencing valve and a safety switch. The single-tub models can be had with or without pumps, while the wringer is interchangeable with a 26-in. roll ironer providing 80 lb. automatic pressure. In addition, "Universal" ironers are obtainable in table and cabinet forms.

Pye machines are of 13.5 and 16 gal. capacity; the larger of the two has an overload switch and an emptying pump. The 10 gal. Falk, Stadelmann washer takes 6 lb. of dry clothes, an ironing attachment being usable in place of the wringer. Westinghouse designs take up to 50 lb. of dry clothes (16 gal.), and all have draining pumps; one of the two round models is controlled from the wringer, thus obviating bending down. A fully enclosed wringer is attached to the cabinet type.

The electrically welded Apex-Vactric designs have domed covers and a three-vane spiral agitator with either a quick-drain bottom or motor pump. Three of them have Lovell wringers and one is controlled by two foot pedals below the skirting which hides the legs. The fourth is a twin tub model of 0.25 HP for washing, rinsing and spin-drying, the control lever of which prevents the lid being opened while the centrifugal basket is in motion. There are six controls for the table-type ironer, namely, knee and finger switches for the roll, press-dryer regulator, separate switches for the motor and shoe heater and an emergency release lever. The smallest Sears, Roebuck "Kenmore" is of one-sixth HP, others having a 0.25-HP "Sunlight" motor mounted on blocks of rubber and directly connected to worm gearing by a flexible coupling. A Chamberlain wringer and a two-way "anti-gurgle" power driven pump are fitted.

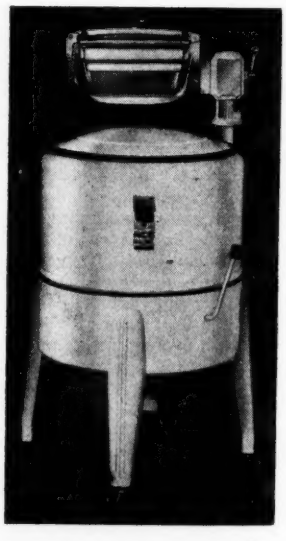
Rubber moulding round the edge of the lid of "H.M.V." washers minimises the escape of steam while the inward-curving neck of the tub prevents water splashing out. The tub is suspended in the skirting by a rubber moulding which forms a heat-insulating cushion and reduces vibration. Table ironers on tubular frames with locking castors have a shoe loading of 1,300 W.

The Balcombe-Crosley also has a rubber-cushioned tub of 18 gal. size, 13 in. deep and 22 in. in diameter, as well as a rubber edge ring round the steel lid. The roll ironer stands on a tubular frame and a cabinet top cover is obtainable as an extra.

The English Electric washer is rectangular, the controls being reachable from all sides. There is a flat table top for use when the wringer is detached for storage on a shelf below. A pump is fitted.

The low-priced "Goblin" of the British Vacuum Cleaner and Engineering Co., Ltd., is of simple construction in a tubular frame without castors and of knee-height, so occupying little space when the hand wringer is folded down sideways. The larger models have a corrugated tub with the agitator at the top instead of at the bottom as is more usual; it can be lifted out to avoid entanglement when using the electric wringer, which carries the switch as well as the roller release and control. Thus touching the safety guard stops everything, allowing the rollers to separate and remain inoperative until reset.

The washer sold by Drake & Gorham Wholesale, Ltd., has a welded channel frame and a rectangular enamelled case. A separate motor switch is added when 3-kW elements are fitted, the latter with two foot-press Tucker switches. Heating with a normal load of clothes takes 20 min. from



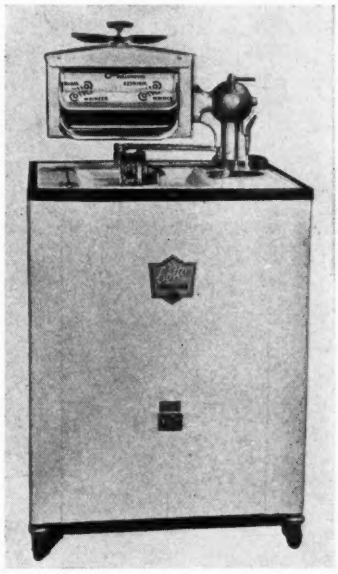
The "Ace" washer has a domed cover in modern style

cold to 140 deg. F. and 55 min. to boil. A cut-out operated by water level is an extra and the wringer is interchangeable with a roll ironer of 1,150 W incorporating a pilot lamp.

An uncommon design is the "Bendix," which pre-soaks, washes, rinses and damp-dries in a single cabinet with a circular glass window in front through which the several operations can be watched, serving also for filling and emptying the container. All operations are automatic, there being two rotary control knobs, one for pre-selecting the operations and the other for timing them.

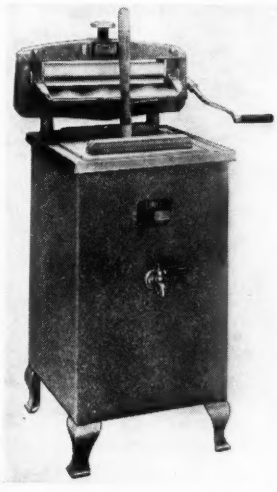
MacGregor & McCallum, Ltd., and the associated Ace Electric Co. offer a machine of modern appearance. It is driven by a "Delco-Remy" motor and 0.25 kWh is said to suffice for doing an average family wash, including wringing, in less than an hour. Washers offered by Electrical Components, Ltd., and Madison Appliances, Ltd., have electrically welded frames of the "1900 Corporation" type and are driven by Delco motors.

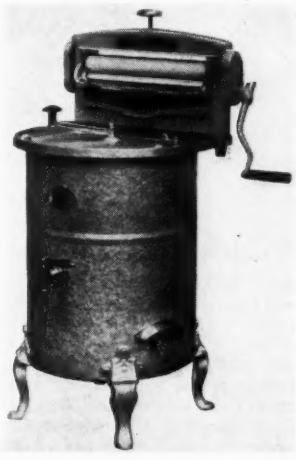
Among lower priced combination designs, consisting of a clothes boiler fitted with a hand agitator and wringer, is the round Burco with an automatic safety switch and the rectangular design of S. Simister & Co. (also Hogan & Wardrop, Ltd.), whose square and round washboilers include one with an outlet spout for providing bath water, while their new 4-gal. "Dinky" of 2 kW is bucket-like and portable with two handles, drainer and lid. Square and round Alder wash boilers are supplied with built-in rotary or foot switches, one model being usable for heating bath water, while another is a 3-kW heated hand washer with a wringer that can be folded to form a flat table top.



The heated "Cotto" is said to be the only washer without a built-in agitator

The range of the Universal Boilers & Engineering Co., Ltd., is somewhat similarly contrived. Two types of cut-out are employed—a Satchwell fusible plug which releases a spring switch, and a double pole push-pull switch on the ratchet wheel principle, which is released by the softening of solder in a cup and re-engaged after solidification by pressing a knob. The company's boiler-washers are now marketed under the name of "Versco."





Hand-operated washer-boilers include the rectangular Universal Engineering type (left) and round Burco (right) while the unconventional American "Bendix" (below) performs several operations automatically

The G.E.C. wash boiler loading is 3 kW with copper sheathed strip elements of 500 W each that can be protected by an automatic cut-out which is easily reset by pressing a knob projecting through the false bottom of the boiler; a percolator may be added. Revo boilers are listed with alternative finishes and differing types of lids, some incorporating a steam condenser. Loadings go up to 3.6 kW and an automatic cut-out can be incorporated, one model being intended for heating bath water as well as for clothes boiling. W. T. French's "Mysto" has a galvanised steel casing and a D-shaped hinged lid. Falk, Stadelmann's smallest is of 7.5 gal. capacity and 2 kW loading, the two larger sizes being fitted with a 20-A "Efesca" cut-out.

One of the Siemens Electric Lamps and Supplies designs has a white enamelled table top over a hinged lid of polished copper; mica or "Chromalox" elements are fitted and a safety cut-out may be had as an extra. One model by Drake & Gorham Wholesale, Ltd., has a patent "Manchester" circulating heater with clamped-on elements forming a kind of injector. It is self contained and fitted by a flange to the centre of the pan bottom so as to be removable by hand.

Refinements continue to be added to flat irons. For instance, the Siddons inexpensive "Essco" brand is available with on without a built-in pilot lamp and one enamelled model is pointed at both ends.

One of the Morphy-Richards range has a permanent side-entry connector and temperature selector. A green tell-tale light at the back of the moulded handle is extinguished when the correct heat has been reached and no further electricity is being consumed. There is also an asbestos padded safety stand which can be clamped to the ironing board or table; the iron can be fixed to the stand and put away to cool.

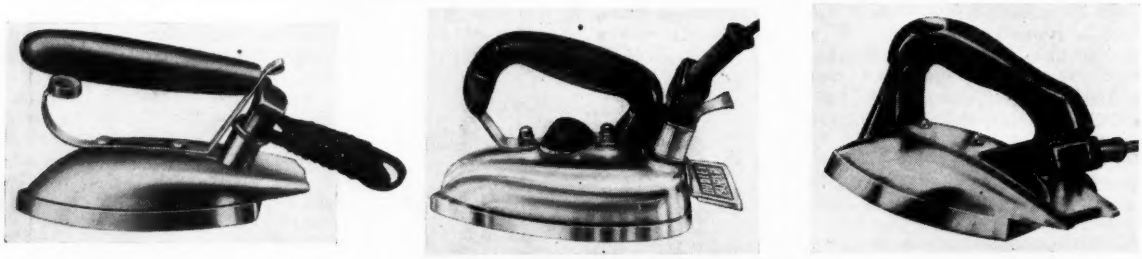
Heat-proof stands are included with some of the sturdy Hawkins irons which go up to 11.25 lb. in weight and 800 W in loading, the automatic AC design having dial temperature adjusters. There is a 2-lb. size with a detachable handle for holiday use. An Alneco model is obtainable for 100 V and some of G.E.C. make can be supplied for 100, 50 or 32 V, also with a detachable handle for use when travelling. There is a Revo lightweight of 250 W with a removable handle for packing in a small oak case and other types with a heat-indicating and switch-connector, or a fixed cable connector that forms the heel rest. Grafton 1¼- and 3¼-lb. sizes for universal voltages are obtainable in leatherette cases and there is a 3-lb. "Eastick," Siemens Electric Lamps & Supplies state that their "Number One" element is guaranteed "for ever" and their "Sentinel" for five years.

The AC 800-W "Hotpoint" is claimed to be the only iron with a swivelling flex device permanently connected to the moulded handle; it has double thumb rests, and five-heat thermostatic control and double bottom grooves in the sole plate. Other styles have cord-bar or switch connectors and box containers are available as well as a sprung flex-supporting arm for clamping to the table. The automatically regulated "H.M.V." iron is obtainable for either AC or DC, but is not "universal". The control knob is fitted into the heel without affecting its utility as a rest and the connector is not detachable.

One of W. T. French's models is supplied in a zip-fastening handbag or box for travelling; others have an AC heat regulator knob, or an indicator with an automatic cut-out in the handle to switch off when the iron is stood on its heel. Similar containers are obtainable from Falk, Stadelmann who have three recently introduced competitive models while their thermostatically controlled iron is to be sold this season with a standard bakelite connector as opposed to last year's "connectorless" model. The Westinghouse "Silver Arrow" has a permanent connector and an "on-off" switch in the heat-regulating dial, which is calibrated according to classes of materials. The British National design has a patent cord grip fixed connector.

The Guiterman streamlined "Sunbeam Ironmaster" has an AC heat regulator. Hattersley Bros.' somewhat snub-nosed irons are known as the "Swinton." Besides the plain Toubkin there is a 750-W "Golden Arrow" of American make with an AC heat regulator. The Pye range is from a 330-W "Baby" weighing 3 lb. to a temperature controlled 625-W size. Other makes include the "Vidor," English Electric, Carron, Simplex, Premier and Beethoven plain and thermostatic, and the A. D. Davidson, while the least expensive of the enamelled variety include the

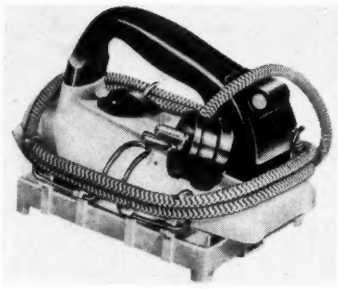
Sloan "Summit" and the "Stirling" brand (wholesale only) of T. Price & Sons with several unusually shaped handles.



Modern streamlined irons include the Falk Stadelmann (left) and Revo "Comet" (right) while temperature regulated types are the C.W.S. (centre) and the Morphy-Richards (below) with a green tell-tale lamp in the handle and a clip-on safety stand

The Salford thermostat for flat irons, household or laundry, is designed as a complete piece of mechanism so that it can be supplied already calibrated to operate over the desired temperature range. The thermostat unit, which may be replaced as a whole, is one of the disc action type, so avoiding flickering which might interfere with radio reception.

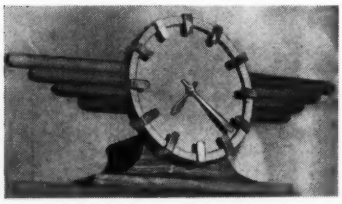
For airing and drying clothes there are enamelled sheet metal cabinets. The Glover "Dryplus" is fitted with a lock and keys, its interior dimensions being 5 ft. 6 in. in height, 1 ft. 8 in. wide, and 1 ft. 5 in. deep. The loading is 2.25 kW with three-heat control and the racks are adjustable to 60 different positions 1 in. apart. There are Westinghouse cabinets and the "Dryad" sold by Drake & Gorham Wholesale, Ltd., has inner and outer shells with 1 in. of heat insulating air space between them and double doors. It is 6 ft. 1 in. high, 2 ft. 9 in. wide, and 1 ft. 8 in. deep with movable racks and is provided with a switch and pilot lamp at the base.



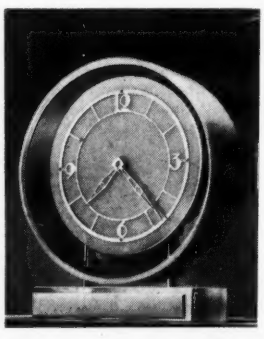
In addition to the double door cabinet type there is an attachment, which is collapsible and folds flat, designed to make use of the mechanism of the "Newmectric" dish washer for drying clothes in kitchenettes and flats where space is limited.

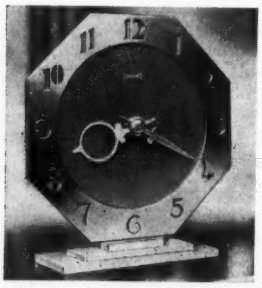
Electric Clocks

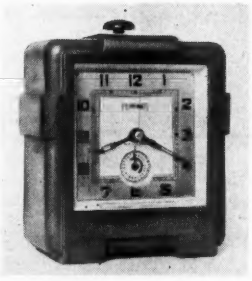
SYNCHRONOUSLY driven clocks for plugging into 50-cycle AC mains are available in a great variety of styles and sizes, including striking, chiming and alarm types. The only recent change of any consequence to be recorded is the advance by 10 per cent. of the current list prices of all makes of clocks sold by members of the British Synchronous Clock Conference, namely, the British Vacuum Cleaner & Engineering Co., Ltd., English Clock and Watch Manufacturers, Ltd., Ferranti, Ltd., Smith's English Clocks, Ltd., T.M.C.-Harwell (Sales), Ltd., General Electric Co., Ltd., Synchronome Co., Ltd., and (associate member) Electrical Commodities, Ltd. The Gent range is well known, while in place of those of French make the Bulle factory in England is now producing both the AC mains variety and the battery class which is claimed to run for nearly three years before needing cell replacement. Callender's make four types of flexible connector especially for clocks, one with a tough rubber sheath and three braided with artificial silk in a range of colours.



Two Bulle designs: The "Hendon" (above) and "Eros"







Ferranti No. 243 (above) and No. 7 "floodlit" alarm clock

A mains-driven clock actuates the "Teesmade" outfit (British Vacuum Cleaner & Engineering Co., Ltd.), for boiling water and automatically making tea, simultaneously switching on a bedside lamp and sounding an alarm. A day model without the clock is operated by a controlling switch. The Hawkins "Tecal" outfit is similarly contrived.

Smith's "Tapeley" (left) and "Lantern"

Health Appliances (*Concluded from opposite page*)

dry. The Concealed Heating Co's "Good Companion" bed warmer is said to be so constructed as not to absorb atmospherical humidity, and its loading is so small as to enable it to be placed permanently "on" between the overlay and spring mattress without interfering with bed-making. Its size is 24 by 16 by ¼ in. and a three-position switch provides for continuous or intermittent heating. The Crittall "Dulrae" bed warmer is a flat panel designed to hang beneath the bed, strapped to the frame and thermostatically controlled. The dimensions of "Thermalux" products, which are specially suitable for warming the foot of the bed, are 3 ft. square or 4 ft. by 2 ft. 3 in.

The G.E.C. "bottle" is made of glazed earthenware and packed with heat-retaining material which is pre-heated by a 500-W element before disconnection for placing in the bed; a protective device prevents initial overheating. The Davidson design is a metal disc loaded to 50 W and having a wire guard above to raise the bed clothes for air circulation.

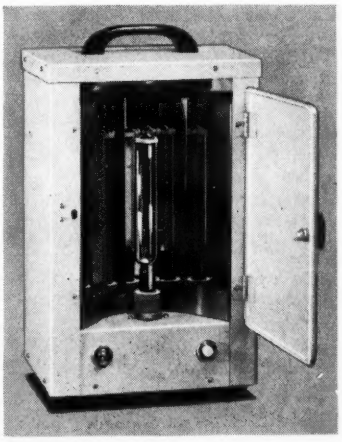
Health Appliances

ULTRA-VIOLET AND INFRA-RED RAY LAMPS, VIBRATORS, ELECTRIC BLANKETS AND BED-WARMERS

AMONG appliances intended for tonic-like stimulation in the home without any general need for medical supervision, the most prominent are probably the "sunlamps." One of the latest Read products is the "Portasun," available as a table model or mounted on a telescopic floor stand with an adjustable head. A 12-in. polished reflector houses a semi-circular quartz mercury-vapour tube, the necessary transformer being fitted inside the surrounding case with a 200-250 V selecting device at the back to enable the lamp to be plugged into any AC socket; it can also be supplied to operate at 50-100 V.

In addition to these "cold" ultra-violet ray lamps there is a selection of Read "Duo-ray" apparatus, hand, table and pedestal models, for producing infra-red rays. The variously shaped metal reflectors are made to accommodate either a "black body" heater element, or a filament, for luminous radiation. The Toubkin "Palm-beach" lamps are of 100 W loading, the 21 in. mercury tube being S-shaped and the 36 in. tube is spiralised within the reflector. The larger size is fitted with an automatic time switch that can be pre-set up to 15 minutes.

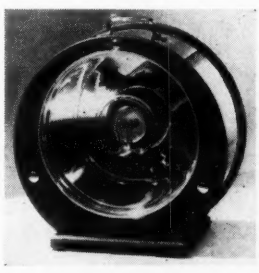
Carbon-arc Collaro sunlamp



New Lumsden ultra-violet discharge lamp

The latest Watson product is an improved infra-red radiator with a bowl reflector named "Sunfra" while one of the "Raysol" models is an arc lamp employing carbon electrodes within iron or tungsten cores. They are horizontally adjustable by means of knobs protruding through both sides of the bowl reflector, in the lower portion of which is a coiled heating element.

Two recently described lamps are the "Collaro" carbon arc (page 230, August 18th, 1939) and the new Lumsden discharge type (page 364, September 15th, 1939) which is in metal cabinet form with a hinged door and compartment for storing the flexible connector and goggles. The combined infra-red and visible heat projector listed by S. Guiterman is portable and unconventional in appearance. There are several Cox-Cavendish patterns of radiant heaters as well as arc and ultra-violet lamps, together with treatment timing clocks for use in conjunction with them. Hanovia lamps are made in a wide range of types and sizes. The G.E.C. "Osram" standard lamp with the transformer in the base is unlike any of the others in that a 400-W bulb is utilised which contains a small filament for automatically initiating an arc between two tungsten electrodes in an atmosphere of mercury vapour.



The latest Read mercury vapour tube lamp and (right) the Auto-Maid heating pad

In addition to infra-red heaters of the bulb and wound element patterns there are London Commercial single and twin arc lamps with heater coils incorporated in the reflector. The "Sol-tan" mercury vapour lamp offered by this company is unusual in appearance. Its 50-W ring-shaped stands vertically in a reflector which is adjustably attached to the top of a drum-like base of perforated metal containing the transformer gear.

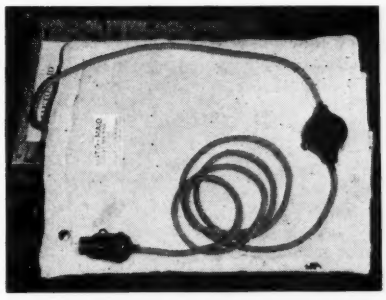
Other varieties of stimulator include the so-called violet-ray outfits that emit a high-frequency discharge through hollow glass applicators of different shapes, which are evacuated, so causing a blue glow. The London Commercial sets are assembled in neat carrying cases with means of adjusting voltage and output. The "Ajax" outfits are claimed to be covered by six patents, and the universal voltage Cox-Cavendish model is suitable for both AC and DC and is of "earth free" design for safety. Several Hawkins outfits are available for from 100 to 250 V inputs.

Hand motors for vibratory massage are also supplied in carrying cases with cup-shaped and padded rubber applicators. The larger London Commercial machine is non-radio interfering and has an interior fan for cooling the motor windings, which are double silk covered and enamelled. A two-speed switch is provided. The G.E.C. design has a 50-W universal motor and a special device enabling two degrees of vibration to be obtained. A pedestal machine is driven by a 200-W motor which is double ended for use with a body belt stimulator. With the Hawkins type speed regulation is possible as is also the case with Gilbert vibrators, which are obtainable in 30- and 40-W sizes, are streamlined giving them an egg-like appearance.

Improved Watson infra-red heat radiator

Besides electrically heated blankets and pads a "Thermega" cage-heater is now obtainable in several sizes for placing round the body or limbs and the heat adjusted as desired, being convenient to use without the heater actually coming in contact with the skin. They can be placed over a cradle instead of the child resting on a heated pad. The Morphy-Richards heating pad has an automatic cut-out in each corner and a three-heat switch. The asbestos-cored element is sewn spiral fashion between layers of fleecy condenser cloth and the whole packed between pads of downy material with an outer cover.

Hawkins pads are obtainable with loadings of 65-40-25 W, the lowered priced variety having three heating speeds controlled by two thermostats that can be adjusted by a through-switch in the connector cord. The larger size has four thermostats, and control in the dark is facilitated by raised projections on the switch. Coloured and waterproof and washable covers are supplied. The Bylock pad has three thermostats and a temperature range of 110-130-160 deg. F. The "Castelco" is stated not to interfere with radio reception.



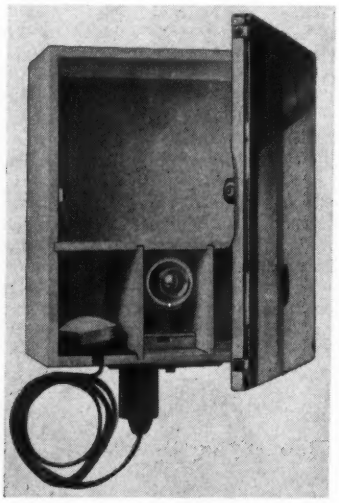
The 65-W Pye bed-warmer pad is controlled by a four-point switch in the lead and is supplied with a muslin slip cover and rubber bag, while the "Auto-Maid" is also provided with a waterproof cover in order to keep the pad

(Concluded at foot of opposite page)

Other Useful Devices

FOR THE HOUSE, GARAGE, WORKSHOP AND GARDEN

APART from the water heaters referred to in an earlier section there are many smaller types of electrical apparatus which come under the heading of bathroom equipment. The Davidson wall cabinet for the bathroom has a mirror door with a frosted circle inset through which a 15-W interior lamp provides light for shaving while its heat prevents the mirror from steaming. There is a single switch for the lamp and a socket outlet for plugging in an electric razor or hair dryer.



Davidson bathroom cabinet

The Toubkin toilet mirror is a pedestal magnifier illuminated by a 60-W lamp. Among illuminated shaving mirrors there are the Pye and Price (wholesale only) and the Vidor mains and battery types. Besides plain and magnifying kinds there are now rectangular Hawkins models fitted with a plug and rack for accommodating an electric dry shaver.

Among dry shavers are the Sloan "Shavemaster" and rotary Packard, instead of oscillating clippers; also the Remington and Rand, the last mentioned needing neither resistance nor transformer, the Schick, and others sold by Hawkins and Falk Stadelmann. The "Specko" is sold by Thomson & Capper (wholesale only).

There is a C.W.S. heater for all sizes of standard curling tongs finished in coloured enamel and chromium plating, being of 150 W loading, as is also the Falk Stadelmann, while the G.E.C. is of 80 W and has a built-in switch. The 25-W "Radiant" hair curling tongs supplied by S.L.R. Electric, Ltd., have coloured handles.

British-made Bylock hair dryers are totally enclosed in bakelite with a dual switch moulded into the handle. It is claimed that no earthing device is needed and the air inlet is at the back, thereby reducing the risk of hair being drawn into the machine. Plated or coloured Falk Stadelmann dryers of 500 W can be obtained with a built-in mirror.

The 550-W "Castelco" has a moulded insulation case and a universal AC-DC motor which does not interfere with radio reception. Neither does the Hawkins, which has an all-bakelite lightweight case with convenient thumb-push switches moulded into the handle. The C.W.S. casing is moulded in mottled colours, weighs 36 oz. and the motor and heating element together are rated at 400 W. The G.E.C. design is of 1,000 W and has a universal motor with a rotary switch and an exceptionally large diameter air outlet part.

Remington (left) and Rand electric dry shavers

The Gilbert machines have enamelled cases of unconventional shapes. The Ormond is all-insulated with push switches in the handle, taking 500 W with heat and 50 W without; a moulded casket is supplied with a mirror and hair setting comb inside the lid. Others are the Toubkin and the Sloan "Summit."

Besides single and double towel rails with loadings of from 175 to 250 W, the most recent Benham design has an additional radiator between the rails consisting of multiple flat bars with loadings up to 400 W. There are several Eastwood models with loadings of from 150 to 400 W and round or hexagonal tubes, being of the self-contained hot water type tested to 80 lb. pressure, some including a radiator. The Falk Stadelmann "Efesca" wall bracket design contains a 30 in. long tubular heater loaded at 150 W; 200 W is the loading of both G.E.C. floor and wall bracket patterns which are provided with proper earthing terminals without flexible connectors.

The Gilbert "Grafton" of 75 W is supported on wall brackets. There is a 50-W Archibald Low type and larger models of the hot water type with round and hexagonal bars. The Vidor is a handsome towel airer and the Price dryer (wholesale only) is not a fixture, being of "clothes horse" design with "Cellon" treated wood rails an da 450-W guarded element at the bottom.

Although primarily designed for greenhouses and capable of being fitted with thermostatic regulation and humidity control, some Electrocult heaters are now suitably finished for household use in halls, on landings, or in garages.

Ice cream freezers are supplied by Hawkins in several sizes, driven by built-in American motors of 60-75 W for AC only. One of the simpler household dish-washing machines is the "Euk" whose only moving part is the impeller driven by a small motor. There are no glands or pump to need looking after and thermostatic control maintains correct water temperature, baskets being furnished in which to pack the crockery for immersion.

C.W.S. "Dudley" hair dryer

The "Hotpoint" is a multi-spray type, as is also the Kent washer, though of different design. The latter can be supplied with motors for voltages down to 50 V and one or two immersion heaters of 1.5 or 2 kW each can be added, all wiring being enclosed in conduit with the switches at the front and a foot-operated draining lever. "Newmectric" dish washers are of cabinet style with loadings up to 1.7 kW, portable models for placing in an ordinary sink being rated down to 150 W.

The Westinghouse cabinet has a door at the front which opens downward, so enabling easy-sliding wire racks to be employed for packing the crockery. Model DW 24 is driven by a ¼-HP motor, accommodates 57 items and needs six quarts of water per wash or rinse, its dimensions being 24 in. wide and deep by 24½ in. in height.

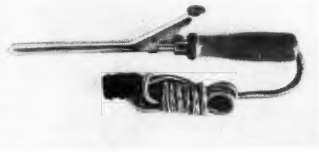
The Crittall "Combirex" food preparation machine is suitable for larger kitchens. Its special feature is that several operations can be performed at the same time, by one or several people. A turntable is fitted and the driving motor is of ¾ HP. In the pedestal is a cupboard for accommodating accessory knives, graters, whisks, &c. There are three Gilbert machines of smaller sizes for similar purposes as well as several drink mixers and fruit juice extractors of various designs.

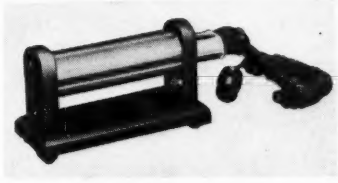
The Hawkins "Culinaire" is a totally enclosed bowl type with the motor in the base and the driving post protruding upward through the bottom of the bowl; there is also a pea-shelling machine which will slice and grate as well. The Pye mixer-beaters with juice extractor and vegetable shredder attachments are driven by 80 W three speed motors. Toubkin beverage and cake mixers, the latter with variable speed control, are of small dimensions.

Simple ventilation can be obtained without creating draughts by causing a reasonable amount of air movement.

three or four changes of air per hour sufficing for rooms occupied in normal ways. For such purposes Air Conditioning and Engineering, Ltd., offers the "Zephaire" cabinet of small dimensions for filtering and circulating warm air and also humidifying and deodorising it if need be. Thermostatic control prevents overheating and an adjustable grille enables the air flow to be directed up or down or to either side.

The "Idaglas" filter is of the adhesive type, consisting of a mat of glass fibres coated with a viscous medium. The 2-kW element, for AC only, operates at black heat and the fan motor is said not to interfere with radio reception; it is resiliently mounted and should it stop the resulting rise in temperature will melt a fuse. The company's extractor fans are made for fitting into windows or to be built-in, a telescopic sleeve permitting adjustment for depth of wall. The 40-W "Ilgette" extracts 27,000 cu. ft. of air per hour and the 70-W "Ilgair" 25,000 cu. ft.





S.L.R. Electric hair curler (left), C.W.S. curling tong heater (below) and Henley's "Solon" soldering iron

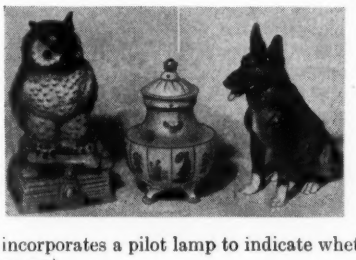
The Ashton bowl which is most useful for removing tobacco smoke from a room by drawing the air through a wet filter, is fitted with three-speed control in the ceiling plate from which it hangs, the loading being 1 or 2 kW; a heater may be included if desired.

The "Newcon" all-steel equipment is known as the "Rektifair" and is said to be particularly suitable for use in tropical countries, since it both cools the air and extracts moisture from it. The cabinet is mounted on castors for mobility and is designed in such a way as to reduce the electrical load, which is normally about 750 W. With thermostatic expansion valve control the operation is intermittent so that the load over a period may be reduced to an average of 500 W. Freon is the refrigerant employed, the twin-cylinder compressor operating at 490 RPM and the condenser being cooled by forced draught. The driving motor is fitted with a radio interference suppressor.

The 1,200-W Gilbert fan heater has a louvred circular housing on an oval base, the motor being non-radio interfering. There are also rubber-bladed fans and floor-pedestal models. The Hawkins cabinet has a 1,320 W element in front of the fan and the Toubkin "Arvin" fan-forced heater of 1,250 W has a pressed steel housing finished in coloured enamel.

A combined fan-heater and deodoriser sold by Falk Stadelmann is drum-like on an adjustable pedestal, of 1,000 W hot loading and 25 W when cold, with a pad in the container that can be soaked with perfume or a disinfectant. Single- and three-speed C.W.S. oscillating fans are of 12 in. diameter and 32 W, finished in brass and black; smaller coloured models are of 30 to 60 W. "Eureka" fans are of Diehl-Singer manufacture.

Besides a variety of conventional patterns the G.E.C. "Xpelair" is designed for insertion in a glass window pane and guaranteed to remove 14,000 cu. ft. of air per hour. The 25-W motor is single-phase and does not cause radio interference, the pressed steel casing having exterior baffles to exclude wind and rain. The "Vent-Axia" was one of the first of this class and is available in an all-bakelite moulded casing. The latest model is described as the "Silent Nine" stale air extractor for AC; it is provided with a three-speed choke control switch and incorporates a pilot lamp to indicate whether the fan is running or not.

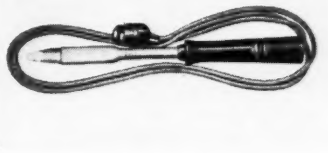


"Auto-maid" perfume diffusers

The pedestal of the Gilbert "Grafton" is hinged for adjustability and a switch of the push-on kind is housed in the base which has four rubber feet. The "Ormond" has an unusually shaped blade guard. Veritys, Revo, Crompton Parkinson and Guiterman are other popular makes. "Auto-Maid" perfume diffusers are made in the forms of ornamental vases, animals and birds with glass eyes, the liquid being volatilised through perforations by the heat of a low-wattage lamp bulb inside, thus serving also as night-lights for children.

"Desmo" motor-car accessories include a radiator heater fitted with an earthing clip and a two-way switch adaptor which enables a lamp to be used while the heater is being placed in position. The G.E.C. tubular design for under-bonnet warmth is of 50-75 W for a voltage range down to 50 V. The Hawkins 100-W "Peter-the-Heater" is very moderately priced.

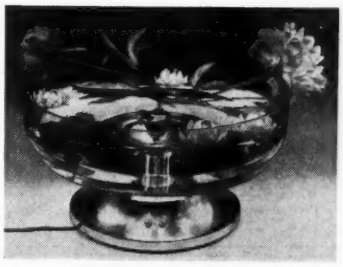
The Westinghouse "Westric" car battery trickle charger of the copper-oxide type is most useful in private garages. The Philips design combines a transformer and rectifying valves in a metal case with non-reversible output for charging 12 to 6 V batteries at 1.5 A, which rating of 40 W means that one kWh suffices for 25 hours charging.



Among soldering irons there are the Henley "Solon" of 65 W and resin cored solder in the form of alloy tubes; the Falk Stadelmann "Matchless" is of 65 W with straight, hatchet or pencil bits. Another supplier is the Radio-Electric Products Co.

Ransomes, Sims & Jefferies lawn mowers are driven by ¼- or ½-HP single-phase motors of the company's own manufacture, through a single plate clutch with Bowden wire control. Power transmission is direct by chain from the motor shaft to the cutting cylinder, thence to back rolls through a train of steel gearing. The Stokes garden fountain is inexpensive and easily fitted; it operates on the electro-magnetic principle without rotary parts, and is rated at 6 W. Still smaller sizes are made for use in table bowls indoors or in an aquarium tank. H. W. Carter & James, Ltd., specialise in the making of wire accessories of all sorts, such as guards for fires, fans and lamps, toast racks, welded oven racks and refrigerator shelves.

H. Clarke & Co. (Manchester), Ltd., produce mica stamped to size and calibrated for such domestic appliances as kettles, irons, heaters, toasters, boilers, stoves, &c., as well as completely wound elements for such appliances. Mica Elements (1927) also specialise in the manufacture of components of these kinds, and Henry Wiggin & Co., Ltd., are well-known makers of resistance alloys of all kinds, among which is "Thermometal" for bi-metal thermostats, as well as "Inconel" hot-plate sheaths and covers.



Stokes table fountain

Wires Across Road

AT Chippenham (Wilts) Police Court last week, Arthur Perry, an employee of the Wessex Electricity Co., appeared in answer to a summons alleging that he placed electric wires across the main street without taking reasonable precautions, and there was also a summons against the company for causing the wires to be so placed.

Mr. A. C. Hillier, defending, stated that there was a breakdown in the main High Street cable at midnight on July 23rd-24th and Perry was called out of bed to deal with it. He worked until 2.30 a.m. to give a temporary supply to the Co-operative Society. The wires were stretched about 17 ft. above the road. When he resumed work at 8 a.m. he found that they had sagged and he posted a man to warn very high traffic of the danger. While he was engaged elsewhere another foreman took the man away. Even so, nothing would have happened had not such an inordinately high vehicle (a lorry carrying aeroplane wings, one of which struck the wires) happened to come along. Mr. Hillier said he had never seen such a high load in England and contended that every reasonable precaution was taken.

The summonses were dismissed, the presiding magistrate, Major W. L. Lysley, stating that the Bench had failed to reach a unanimous decision in the matter.

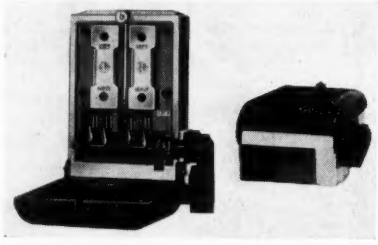
Wiring and Accessories

RECENT IMPROVEMENTS IN INSTALLATION EQUIPMENT

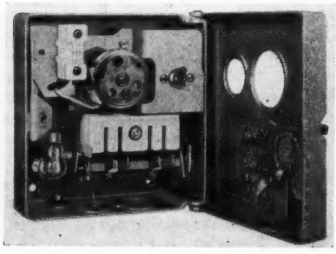
ALTHOUGH standardisation in installation work has been advanced by the issue earlier this year of the eleventh edition of the I.E.E. Wiring Regulations, which require compliance with a very much larger number of B.S.S. than before, there is plenty of scope for development within the framework thus set up. The Regulations themselves have been modified in many important respects, for details of which readers are referred to the articles by Mr. H. R. Taunton that have appeared in the ELECTRICAL REVIEW during the past few weeks—more particularly that entitled "Accessories and Appliances" in the issue of September 1st.

Present trends are well illustrated in the products designed to meet present-day needs in the basic installation itself, much of which is required before the other apparatus described in this issue can be connected to the mains.

Starting from the supply end, there is the wide range of iron-clad switch and fuse gear for practically all purposes produced by Revo Electric Co., Ltd., the heavier types of which, rated at from 15 to 60A, can be supplied with fuse-carriers suitable for use with English Electric or Reyrolle high-rupturing-capacity cartridge fuses. The same concern makes both iron-clad and all-insulated splitters, and iron-clad fuse distribution boards from one-way upwards fitted with Revo fuses.



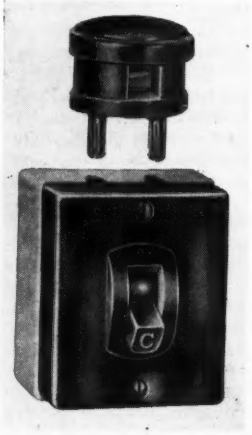
"Insulok" all-insulated switch-fuse (Bill Switchgear, Ltd.)

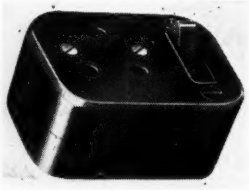


New G.E.C. cooker control unit

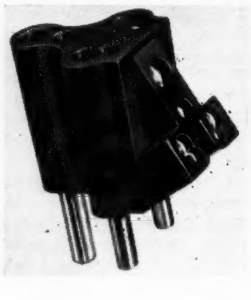
During the year the Midland Electric Manufacturing Co., Ltd., has introduced new models of distribution sets in cast-iron cases for installations in flats, having main double-pole switch and fuses connected to cooker and lighting sub-circuit fuses; separate covers are provided for main and sub-circuits. The company has also redesigned its range of splitters and has introduced 15- and 45-A units; all switch contacts are shielded. Shockproof practice is exemplified by the M.E.M. all-insulated 5- to 30-A switch fuses and 15-A two-way splitter.

The same tendency is observed in the new 30-A "Insulok" switch-fuse of Bill Switchgear, Ltd., which can also be supplied in an iron-clad form. This development is matched by a 30-A two-way splitter (to which a three-way model is to be added in the near future) and single-pole and neutral switch-fuses, splitters and distribution boards in teak and cast-iron cases. A further 1939 development is a 30-A cooker switch with a 15-A sub-circuit.





Newcomers among cooker control units are two manufactured by the General Electric Co., Ltd., rated at 30-A and fitted with both mechanical and luminous indication. One has a 5-A and the other a 15-A sub-circuit socket outlet of the damper-shutter type controlled by a d.p. switch, with one or two fuses as required, the whole assembly being mounted on a hinged chassis. In addition to a 30-A cooker control unit with two sub-circuits generally similar to the foregoing, A. Reyrolle & Co., Ltd., supply a change-over switch which enables a supply to be given either to the cooker or to a water-heater or other appliance.

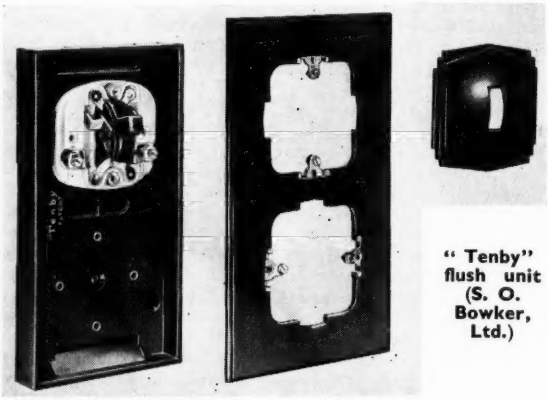


Left: Crabtree combined switch-socket. Above: "Wylexion" switch-socket (G. H. Scholes). Below: Grelco adaptor. Right: M.K. plaster-depth box for "Slot" switches

Miniature circuit-breakers, as a substitute for circuit fuses, are made by Nalder Bros. and Thompson, Ltd., in their "Bijou" series. They are also offered by the Combi Electric Co., Ltd. These function by the expansion of alloy struts which operate a toggle mechanism.

Socket outlets continue to be improved. George H. Scholes & Co., Ltd., have this year brought out an AC switch controlling round-pin socket outlets (complying with B.S.S. 546) as well as one for use with "Wylex" flat pins. These are rated at 2-, 5- and 15-A and non-switched socket outlets are available for the same capacities.

Another similar new product is the "Lincoln" combined 5-A switch and 2-A socket outlet for two or three pins, which is among the latest of the many developments of J. A. Crabtree & Co., Ltd. This is similar in design and appearance to its companion rectangular switch, having socket tubes of the claw-grip type, and is intended for a high fixing level. Mechanical interlocking is a well-known feature of the comprehensive group of three-pin switch-sockets manufactured by M. K. Electric, Ltd., and a similar principle is a feature of those available from the Wandsworth Electrical Manufacturing Co. as part of a varied stock of domestic electrical products.

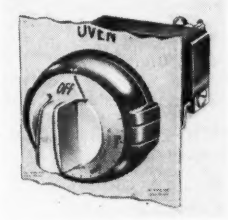


"Tenby" flush unit (S. O. Bowker, Ltd.)

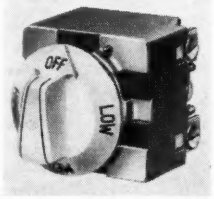
Shuttered switch sockets are a notable item in the AC range of J. H. Tucker & Co., Ltd. In addition to the normal surface and flush patterns a "boxless" shrouded type is available that obviates the use of wood or iron boxes in skirtings. The switches are short-slow-break and quick-make for 5- or 15-A. The short base of the AC flush switch is a useful feature for multi-section arrangement, as the internal wiring space is exceptionally large for a standard size of box.

With a view to securing complete interchangeability of apparatus when sockets do not strictly coincide with B.S.S. dimensions, British Mechanical Productions, Ltd., offer "Flexipin" self-adjusting plugs with spring-pressure contact for 2-, 5-, and 15-A as part of the "Clix" group of accessories, which also include skirting boxless sockets designed to allow a greater number of points to be installed at low cost.

Three new types of multi-plug adaptors have been put on the market by Grelco, Ltd., so that the series now extends from 2-A two-pin plugs with two similar sockets to a 15-A three-pin size with three-pin top and side sockets for 15/5 A each.



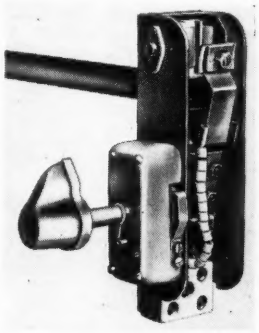
Above: Revo iron-clad cooker control panel. Below and right: "Diamond H" cooker switch and thermostat

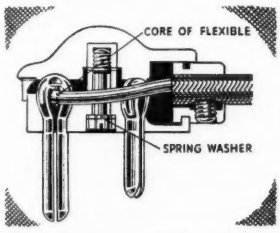


The flush model of "Tenby" pilot switch, made by S. O. Bowker, Ltd., embodies an improved design of graduated (side or back) cable entry which can be adapted to various sizes by a screwdriver; alternative tapped holes in the base of the moulded box for fixing screws allow of either horizontal or vertical mounting. The cover plate has a flexible frame and a separately secured centre panel. The semi-recessed model is now available in ¼-in. and ½-in. units. All patterns have a quick-make-and-break action, the latter taking place in two arcing channels. A novel switch made by the C. & D. Manufacturing Co., is the 1,000-W scintillator which can make and break a circuit 350 times per min.

Side- and top-entry iron and kettle connectors are useful members of the large "Goltone" family of domestic accessories for which Ward & Goldstone, Ltd., are responsible. T.M.C.-Harwell (Sales), Ltd., have now an iron connector with a d.p. quick-make-and-break switch, operated by a push-bar.

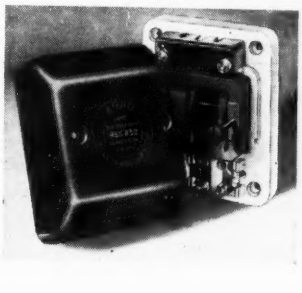
Ceiling switches of the "Landor" rapid-make rapid-break type for 3- and 5-A are a development of the General Electric Co., Ltd., who also offer small BC lampholders and large-base ceiling roses, both in bakelite, and market the "Philplug" wall plug and its accessories. One- and two-way ceiling 5-A switches with porcelain base and bakelite covers are a new departure in the output of George Turnock, Ltd.





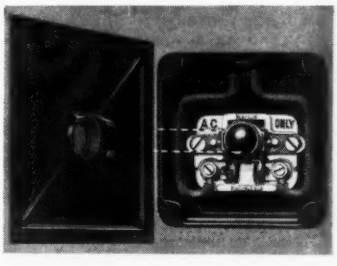
Left: "Flexipin" self-adjusting plug (British Mechanical Productions). Above: Salford cooker thermostat

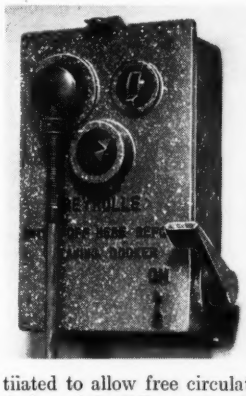
Shockproof pendant lampholders occupy a leading position in the "Nettle" series manufactured by Victor H. Iddon, Ltd., and coloured erinoid flex connectors are a feature of the list of Lachrinoid Products, Ltd. Coloured plastic accessories are also put forward by the Ormond Engineering Co., Ltd., and some of a luminous type, of which a bell push is a good example. An illuminated bell-push for use with transformers, made by V. & E. Friedland, Ltd., burns for 3,000 hr. for a consumption of 1 kWh. For making connections to appliances the Saxonia Electrical Wire Co., Ltd., draws our attention to "Saxoflex" non-kinking, non-fraying domestic flexible, the conductors of which are insulated with two layers of v.i.r., wormed circular and tough-rubber-sheathed overall and finally braided with glacé cotton. A new double-wound transformer for bells has been brought out by Agro Electrical Co., Ltd., in 5-, 10-, and 20-VA sizes; the primary voltage is 200-250 and the secondary 4, 8 or 12. Harsh-sounding bells or buzzers can be replaced by "Mello-Chimes," operating at 8 to 10 V, AC or DC, with distinctive notes for different circuits; these are made by Air Conditioning & Engineering, Ltd., in three models.



Agro bell transformer

Economy in staircase lighting by automatic switching off after an adjustable period up to 20 min. is to be expected from the use of the Venner staircase switch in which is incorporated a forty-day hand-wound or electrically wound clock. Clock controlled equipment for hall lighting is also available. Remote control of another kind is provided by Londex electro-magnetic relays with switching capacities of from 1-2 A upwards.



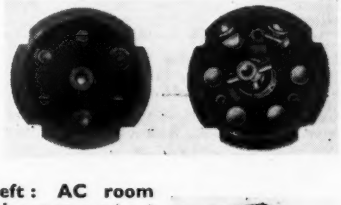


Left: Reyrolle cooker control unit. Above: Tucker narrow base AC flush switch

Control of temperature is catered for by the British Thermostat Co., Ltd. A new feature this season is the ACM room thermostat, which is essentially the AC type mounted in a metal case ventilated to allow free circulation of air over the element. The design of the RT type has been altered to permit of operation without readjustment at any load up to 15 A at 250-V for AC circuits and 1 A for DC.

A thermostat for use in domestic water heaters or for electrifying existing hot water systems is being made by Sunvic Controls, Ltd.; its operation depends upon the differential expansion of the rod and concentric tube forming the stem. Three sizes are made to suit different temperature ranges:—12 in. for 20 to 200 deg. F.; 18 in. for 80 to 200 deg. F.; 24 in. for 100-200 deg. F. The thermostat is rated at 15 A, 250 V on AC and 0.1 A on DC. A new hot-plate control by the same company, the "Simmerstat," was described in our issue of August 4th.

The application of thermostatic control to cooking is also put forward by "Diamond H" Switches, Ltd., in association with a new quick-make-and-break cooker switch with self-indicating handle marked with the heat indications approved by E.D.A. A new water-heater thermostat is another interesting product of the same concern.



Left: AC room thermostat (British Thermostat Co.) Above: Salford electric iron thermostat. Right: Ormond bell-push

Salford Electrical Instruments, Ltd., is also manufacturing a cooker thermostat; the device is standard for G.E.C. cookers, but can be incorporated in those of any other make. A different type of Salford thermostat is a snap-action pattern for operating fire-alarm circuits. Oven control by time instead of by temperature can be obtained by the use of clocks made by Smith's English Clocks, Ltd., and by the Horstmann Gear Co., Ltd. Clocks are also used for defrosting refrigerators daily by the "Frostoff" method of A. J. Balcombe, Ltd.

Manufacturers' Names and Addresses

PRODUCERS OF APPARATUS MENTIONED IN THIS ISSUE

FOR the convenience of readers wishing to get in touch with the makers of the various products mentioned in the preceding reviews we give below a list of their names and addresses :—

Ace Electrical Co., Queen Street, Huddersfield.
Agro Electrical Co., 233, Shaftesbury Avenue, W.C.2.
Aidas Electric, Ltd., Sadia Works, Park Avenue, North Circular Road, N.W.10.
Air Conditioning & Engineering, Ltd., 123d, Victoria Street, S.W.1.
Air-Way, Ltd., 7, Park Lane, W.1.
Ajax, Ltd., 25, Holborn Viaduct, E.C.1.
Alder Electrical Appliances, Ltd., Rushworth Street Burnley.
Allom Bros., Ltd., 16, Grosvenor Place, S.W.1.
Alneco, Ltd, 16, Theodore Street, Birmingham.
Apex-Vactric, Ltd., Waterloo Road, N.W.2.
Arora Co., Loughborough, Leicester.
Ashton, H., Bull's Head Passage, Market Place, Manchester.
Auto-Maid Vacuum Cleaner Co., 23, Crawford Street, W.1.

Balcombe, A. J., Ltd., 52, Tabernacle Street, E.C.2.
Bamber, H. D., 13, Baring Road, Addiscombe, Surrey.
Bank Hardware Manufacturing Co., Ltd., Whittimere Street, Walsall.
Bastian & Allen, 24, Bedford Square, W.C.1.
Beethoven Electric Equipment, Ltd., Chase Road, N.W.10.
Bell Fireplace Co., Kingswell Works, Northampton.
Belling & Co., Ltd., Bridge Works, Southbury Road, Enfield.
Bendix Home Appliances, c/o American Commercial Attaché, 1, Grosvenor Square, London, W.1.
Benham & Sons, Ltd., 66, Wigmore Street, W.1.
Benjamin Electric, Ltd., Brantwood Works, Tariff Road, N.17.
Berry's Electric, Ltd., 85, Newman Street, W.1.
Bertram Thomas, Worsley Street, Hulme, Manchester.
Best & Lloyd, Ltd., Handsworth, Birmingham.
Beat Products, Ltd., Felix Works, Felixstowe.
Bill Switchgear, Ltd., Aston Lane, Perry Barr, Birmingham.
Bisseker, Henry, Ltd., 9-15, New Bartholomew Street, Birmingham.
Bobin, Maurice, 78, Milton Street, E.C.2.
Bowker, S. O., Ltd., Tenby Works, Regent Row, Birmingham.
Bowthorpe Electric Co., Ltd, Goodtric Works, Purley Way, Croydon.
Bratt, Colbran, Ltd., 10, Mortimer Street, London, W.1.
Bray, Geo., & Co., Leeds.
British Electric Equipment Co., Ltd., 12, Norfolk Street, W.C.2.
British Mechanical Productions, Ltd., 79a, Rochester Row, S.W.1.
British National Electrics, Ltd., Newarthill, Lanarkshire.
British Thermostat Co., Ltd., Teddington Works, Windmill Road, Sunbury.
British Thomson-Houston Co., Ltd., Crown House, Aldwych, W.C.2.
British Trane Co., Ltd., 52, Clerkenwell Close, London, E.C.1.
British Vacuum Cleaner and Engineering Co., Ltd., Goblin Works, Leatherhead.
Brown Bros., Ltd., 20-34, Great Eastern Street, E.C.2.
Bulle Co., Ltd., 187, Tottenham Court Road, W.1.
Bulpitt & Sons, Ltd., Swansea Works, Birmingham.
Buncher & Haseler, Ltd., Branston Street, Birmingham.
Burco, Ltd., Rose Grove, Burnley.
Bylock Electric, Ltd., 109, South Street, Ponders End.

Callender's Cable & Construction Co., Ltd., Hamilton House, Victoria Embankment, E.C.4.
Carron Company, Carron, Falkirk.
Carter, H. W., & James, Ltd., Balsall Heath Works, Wenman Street, Birmingham, 12.
Castelco (Great Britain), Ltd., 91-93, Southwark Street, S.E.1.
C.C.A. (Vacuum Cleaners), Ltd., 138, Lever Street, E.C.1.
C. & D. Mfg. Co, 3a, Grosvenor Road, Chelsea, W.4.
Century Refrigeration Co., Ltd., 12, Princes Street, Hanover Square, W.1.
Clarke, H., & Co. (M'tr.), Ltd., Atlas Works, George Street, Patricroft, Manchester.
Cole, E. K., Ltd., Southend-on-Sea.
Collaro, Ltd., Culmore Works, Culmore Road, S.E.15.
Combi Electric Co., Ltd., 85, Cromwell Road, London, S.W.7.
Concealed Heating Co., 7, Baker Street, W.1.
Co-operative Wholesale Society, Domestic Electric Appliance Department, Dudley.
Corfield-Sigg, Ltd., Trafalgar Works, S.W.19.
Cooper & Smith, 94, Charlotte Street, W.1.
Cotto Products, Enterprise Works, Scunthorpe, Lincs.
Courtney, Russell & Co., Ltd., 31, Fitzroy Square, W.1.
Cox-Cavendish Electrical Co., Ltd., 46, Marylebone High Street, W.1.
Crabtree, J. A., & Co., Ltd., Lincoln Works, Walsall.
Crittall, Richard, & Co., Ltd., Bush House, W.C.2.
Crompton Parkinson, Ltd., Bush House, Aldwych, W.C.2.

Davidson, A. D., Electrical Co., 82½, Hurst Street, Birmingham.
Dernier & Hamlyn, Ltd., 23, Newman Street, W.1.
Desmo, Ltd., Stafford Street, Birmingham.
"Diamond H" Switches, Ltd., Gunnersbury Avenue, W.4.
Dominion Electrical Co., 160, New Cavendish Street, W.1.
Dowsing Co. (Electrical Manufacturers), Ltd., Kangley Bridge Road, S.E.26.
Drake & Gorham Wholesale, Ltd., 77, Long Acre, W.C.2.
Dugdill, John, & Co., Ltd., Hazel Grove, near Stockport.

Easco Electrical Service, 1, 3 and 18, Brixton Road, S.W.9.
Easiwork, Ltd., 242, Tottenham Court Road, W.1.
Eastick, J. J., & Sons, 118, Bunhill Row, E.C.1.
Eastwoods, Ltd., 47, Belvedere Road, S.E.1.
Edison Swan Electric Co., Ltd., 155, Charing Cross Road, W.C.2.
Elco (Treforest), Ltd., Treforest Trading Estate, near Cardiff.
Electric Art Shades (1928), Ltd., 81, Feering Factory, Kelvedon.
Electric Depôt, Ltd., Pritchett Street, Aston, Birmingham.
Electrical Commodities, Ltd., Beresford Avenue, Wembley.
Electrical Components, Ltd., 102, Snow Hill, Birmingham.
Electrocult Co., Ltd., Harpenden, Herts.
Electrolux, Ltd., 153, Regent Street, W.1.
Electroway Heaters, Ltd., Baxter Gate, Loughborough.
Eltron, Ltd., Salisbury Square House, E.C.4.
English Clock & Watch Mfrs., Ltd., Cricklewood Works, N.W.2.
English Electric Co., Ltd., Preston, Lancs.
Euk Manufacturing Co., Ltd., Broughton Market, Edinburgh.
Eureka Vacuum Cleaner Co., Ltd., 8, Fisher Street, W.C.1.
Eveson Bros. (1938), Ltd., Lye, Worcs.

Falk, Stadelmann & Co., Ltd., 83, Farringdon Road, E.C.1.
Ferranti, Ltd., Hollinwood, Lancs.
French, W. T., & Co., Ltd., Mysto Works, Browning Street, Birmingham.
Frigidaire, Ltd., Edgware Road, The Hyde, N.W.9.
Froy, W. N., & Sons, Ltd., Brunswick Works, Hammersmith, W.6.

Galsworthy, Ltd., 21, Varndell Street, N.W.1.
General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.
Gent & Co., Ltd., Faraday Works, Leicester.
Geyser Manufacturing Co. (1932), Ltd., 1, Goodwin Street, N.4.
Gilbert, A. C., & Co., 109, Kingsway, W.C.2.
Glover, J., & Sons, Ltd., 39, Groton Road, S.W.18.
Grafton Heater Co., 9, Jays Buildings, Muriel Street, N.1.
Graham Farish, Ltd., 153, Mason's Hill, Bromley, Kent.
Grelco, Ltd., Stanley Road, Teddington.
Guiterman, S., & Co., Ltd., 35, Aldermanbury, E.C.2.
G.V.D. Illuminators, Ltd., Aldwych House, W.C.2.

H. & D., Ltd., Forest Road, South Yardley, Birmingham.
Hanovia, Ltd., Bath Road, Cippenham, Slough.
Harcourts, Ltd., Stanhope House, Kean Street, W.C.2.
Hart Foundry Co., Ryland Street, Birmingham.
Hattersley Bros., Ltd., Queens Foundry, Swinton.
Hawkins, L. G., & Co., Ltd., 30, Drury Lane, W.C.2.
H. & C. Electric Lamps, Ltd., 123d, Victoria Street, S.W.1.
Heatrae, Ltd., St. George Street, Norwich.
Henley's, W. T., Telegraph Works, Co., Ltd., Milton Court, Westcott, Dorking.
H.M.V. Household Appliances, Ltd., 363, Oxford Street, W.1.
Hogan & Wardrop, Ltd., 25, Old Street, E.C.1.
Hollmann, Oswald, 26, Hanover Square, W.1.
Holophane, Ltd., Elverton Street, S.W.1.
Horstmann Gear Co., Ltd., Newbridge Works, Bath.
Hotpoint Electric Appliance Co., Ltd., 24, Newman Street, W.1.

Iddon, Victor H., Ltd., Harper Road, Wythenshawe, Manchester.
Ideal Boilers & Radiators, Ltd., Ideal House, Great Marlborough Street, W.1.
India Rubber Gutta Percha & Telegraph Works Co., Ltd., Thames House, Millbank, S.W.1.
International Refrigerator Co., Ltd., 54, Victoria Street, S.W.1.

Jackson Electric Stove Co., Ltd., 143, Sloane Street, S.W.1.
Johnson & Phillips, Ltd., Charlton, S.E.7.
Joyner, C., & Co., 209, Newtown Row, Birmingham, 6.
J.P. Tubular Heater Co., Newarthill, Motherwell.

Kandem Electrical, Ltd., 769, Fulham Road, S.W.6.
Kelvinator, Ltd., 258, Gray's Inn Road, W.C.1.
Kent Dish Washing Machine Co., Ltd., 190, Thornton Road, Croydon.

Lacrinoid Products, Ltd., Stafford Avenue, Gidea Park, Hornchurch.
Linolite, Ltd., 96, Victoria Street, S.W.1.
Londex, Ltd., Brettenham House, Strand, W.C.2.
London Aluminium Co., Ltd., Westwood Road, Witton, Birmingham.
London Commercial Electric Stores, Ltd., 13, Farringdon Avenue, E.C.4.
Low, Archibald, Electrics, Ltd., Newarthill, Lanarkshire.
Lumsden, D. M., Millburn, Almondbank, Perth.

MacGregor & McCullum, Ltd., 1, Newman Street, W.1.
Madison Appliances, Ltd., Windsor House, Victoria Street, S.W.1.
Magrini, Frank V., Ltd., 19, Oxford Street, W.1.
Mallinson & Eckersley, Ltd., Worsley Street, Salford.
Marco Refrigerators, Ltd., Rowan Road, S.W.16.
Mather & Platt, Ltd., Park Works, Manchester.
Mek-Elek Eng., Ltd., 16, Douglas Street, S.W.1.
Mica Elements (1937), Ltd., 42, Heigham Road, East Ham, E.6.
Midland Electric Mfg. Co., Ltd., M.E.M. Works, Reddings Lane, Birmingham.
M.K. Electric, Ltd., Wakefield Street, N.18.
Moffats, Ltd., India Mills, Blackburn.
Monolamp, 308, Regent Street, W.1.
Morley, T. B., & Co., Ltd., Jameson Street, Hull, Yorks.
Morphy-Richards, Ltd., St. Mary Cray, Kent.

Nalder Bros. & Thompson, Ltd., Lane Works, 97a, Dalston Lane, E.8.
Newcon Industries, Ltd., 39-45, Finsbury Square, E.C.2.
Newmectric, Ltd., 108, Victoria Street, S.W.1.
Nox Electric Lamp Co., Ltd., Clarence Road Works, Hunslet, Leeds.

Oldham & Son, Ltd., Denton, Manchester.
Ormond Engineering Co., Ltd., Ormond House, Rosebery Avenue, E.C.1.
Osler & Faraday, Ltd., 89-91, Newman Street, London, W.1.

Philips Lamps, Ltd., Century House, Shaftesbury Avenue, W.C.2.
Pinchbeck Bros., 35, Friday Street, E.C.4.
Premier Electric Heaters, Ltd., Keeley Street, Birmingham.
Pressed Steel Co., Ltd., Cowley, Oxford.
Price, T., & Co., Springhill, Birmingham.
Pye, Ltd., 44, Great Marlborough Street, W.1.

Radio-Electric Products Co., 51, Whitcomb Street, W.C.2.
Ransomes, Sims & Jefferies, Ltd., Orwell Works, Ipswich.
Raysol Electric, Ltd., 65, Basinghall Street, E.C.2.
Read, F. W., & Sons, Ltd., 175-9, Gray's Inn Road, W.C.1.
Remington Rand, Inc., 100, Gracechurch Street, E.C.2.
Revo Electric Co., Ltd., Britannia Works, Tipton, Staffs.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Rotapex, Ltd., 32, Cleveland Street, W.1.
Rowland's Electrical Accessories, Ltd., 156-9, Hockley Hill, Birmingham.

Salford Electrical Instruments, Ltd., Peel Works, Silk Street, Salford, Lancs.
Santon, Ltd., Somerton Works, Newport, Mon.
Saxonia Electrical Wire Co., Ltd., Roan Street, S.E.10.
Schick Dry Shaver Inc., 273, Regent Street, W.1.
Scholes, Geo. H., & Co., Ltd., Wylex Works, Wythenshawe, Cheshire.
Sears, Roebuck & Co., Ltd., Wembley, Middlesex.
Shelley Potteries, Ltd., Longton, Staffs.
Siddons, J. & J., Ltd., Hill Top, West Bromwich.
Siemens Electric Lamps & Supplies, Ltd., 38, Upper Thames Street, E.C.4.
Simister, Samuel, & Co., Croston Street, Bolton.
Simplex Electric Co., Ltd., Broadway Road, Oldbury.
Siroma Engineering Co., Ltd., North Acton Road, N.W.10.
Sloan Electrical Co., Ltd., 54, Fetter Lane, E.C.4.
S.L.R. Electric, Ltd., 17, Hanover Square, W.1.
Smellie, James, Ltd., Oxford Street, Dudley.
Smith's English Clocks, Ltd., Cricklewood Works, N.W.2.
Stevens, Ernest, Cradley Heath.
Stokes Appliances, Ltd., Chandos House, Buckingham Gate, S.W.1.
Straight-Lite Reflectors, Ltd., 73a, Canonbury Road, N.1.
Summerscales, Sons, W. & S., Park Side Works, Keighley.
Sun Electrical Co., Ltd., 118, Charing Cross Road, W.C.2.
Sunbeam Vacuum Cleaner (1938), Ltd., Salisbury Square House, E.C.4.
Sun-Vic Controls, Ltd., Stanhope House, Kean Street, W.C.2.

PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

IN order to meet the needs of the broadcasting service in wartime, certain modifications have been made in the system of the British Broadcasting Corpopration. Sir Allan Powell, chairman, and Mr. C. H. G. Millis, vice-chairman, now constitute the Board of Governors. The appointments of the other members of the Board—namely, Mr. H. A. L. Fisher, Caroline Lady Bridgeman, Capt. Sir Ian Fraser, Mr. J. J. Mallon, and Miss S. M. Fry—have been terminated as from September 5th, 1939.

The general management of the switchgear works at Standard Road, Acton, of Drake & Gorham, Ltd., is now in the hands of **Major P. A. Smith,** O.B.E., A.M.I.E.E. He still retains the managerial control of the contracts and installation departments with which he has been exclusively concerned for many years. **Mr. R. J. Weil** has resigned from the board, and is no longer an employee managing director of the company.

Major P. A. Smith

Mr. H. J. French was presented with a gold watch on behalf of the company and with an easy chair from the employees and staff on his retirement after many years' service with Benjamin Electric, Ltd. The presentation took place on September 26th before a large gathering of his colleagues on the staff of the company.

Mr. C. Price, assistant manager of Buckie Electricity Department, has been appointed manager of the Stornoway Electricity Supply Co.

Mr. G. S. Szlumper, C.B.E., T.D., M.Inst.C.E., M.Inst.T., general manager of the Southern Railway, has been appointed Director-General of Transportation and Movements at the War Office. **Mr. E. J. Missenden,** O.B.E., traffic manager to the Southern Railway has been appointed general manager and traffic manager, and **Mr. J. B. Elliot,** assistant general manager, has been appointed deputy general manager.

Cheltenham Corporation has had fifty-two applications for the vacancy of borough electrical engineer, but in view of the war the Electricity Committee has decided to postpone the appointment, and has arranged for **Mr. W. J. Bache,** M.I.E.E., to continue in office for another year.

Mr. W. J. Bache

Mr. W. J. Ruston has been elected to the board of Ruston & Hornsby, Ltd. Mr. Ruston is a nephew of the late chairman of the company, Col. J. S. Ruston, and is also a director of J. Stone & Co.

Mr. H. P. Marshall, mains superintendent with the Ipswich Corporation, has resigned owing to ill health.

Mr. T. R. Edge, chief technical assistant with the Ipswich Corporation Electricity Department, who will reach the retiring age of sixty-five next March, is to remain in the service of the department owing to the national emergency.

The staff of Leicester City Transport Department presented **Mr. Ben England,** former manager, with an inscribed gold watch at the offices in Abbey Park Road on October 2nd. Mr. England has left to take up a similar appointment at Nottingham. The presentation was made by Mr. J. Ellson, the assistant general manager, and tributes to Mr. England's work were paid by Mr. A. E. Kitchen, accountant, and Mr. J. Whitaker, traffic manager. **Mr. C. Stafford,** the new general manager, and engineer, was welcomed by the staff.

Mr. S. N. Mukerji, M.Sc., A.M.I.E. (India), of Calcutta, has been awarded the Herbert Akroyd Stuart prize of £50 presented by the Council of the Institute of Marine Engineers every two years for the best essay on "The History and Development of Heavy Oil Engines."

Mr. J. P. Wolfenden, M.Sc., engineer with Marconi's Wireless Telegraph Co., Chelmsford, has been recommended as lecturer in electrical engineering at Burnley Municipal College.

Monsieur Jean Tribot-Laspiere, general director of the International Conference of Large Electricity Distribution Undertakings, has been appointed an Officer of the French Legion of Honour.

OBITUARY

Mr. R. B. MacCall.—The death occurred on September 24th of Mr. Robert Burns MacCall, formerly secretary and treasurer of Glasgow Corporation Electricity Department, at his residence at Prestwick, Ayrshire. He was eighty-one years of age. Mr. MacCall entered the service of Glasgow Corporation in 1874 as a clerk. In 1889 he was promoted to the position of accountant, and in 1892, when a sub-committee of the Gas Committee was formed to take the electricity undertaking in hand, he became indirectly connected with the Electricity Department. Four years later that Department had developed to such an extent that it was put under the administration of a committee of its own, and Mr. MacCall was transferred to devote his whole time to the work of that Committee. In 1920 he became secretary and treasurer of the Department, and at the completion of fifty years' service in 1924 he was entertained to a complimentary dinner. He retired from office in 1928.

Mr. J. B. Mackinnon.—The death is announced at the age of sixty-one of Mr. James Buchanan Mackinnon, one of the principal officers of the London Passenger Transport Board. Mr. Mackinnon, who was a younger brother of Mr. Lachlan Mackinnon, the former general manager of the Glasgow Corporation Transport Department, commenced his career with the Glasgow Corporation tramways. He entered the service of the Metropolitan District Railways in 1904, and in 1912 joined the London United Tramways as traffic assistant, becoming traffic superintendent a year later. In 1920 he was appointed superintendent of schedules by the London General Omnibus Co., and was appointed to a similar position on the formation of the L.P.T.B. He became one of the Board's principal officers in April last.

Mr. T. Boyes.—The death occurred recently at his home at Carluke, at the age of seventy-six, of Mr. Thomas Boyes, of Anderson, Boyes & Co., Ltd., electrical engineers and manufacturers of mining plant, Motherwell. Mr. Boyes was chiefly concerned with the commercial side of the business and in the capacity of representative he was well known in the mining industry.

Major H. Parker.—The death has occurred of Major Henry Parker, a director of Thomas de la Rue & Co., Ltd., and manager of the plastic moulding section of the company.

Wills.—Mr. F. Mackenzie Lea, of Henry Lea & Son, consulting engineers, left £17,878, with net personalty of £16,051.

Mr. F. H. James, deputy-chairman and managing director of the Imperial Continental Gas Association, chairman of the East Anglian Electric Supply Co., and the Urban Electric Supply Co., vice-chairman of Edmundsons Electricity Corporation, and a director of several other electricity companies, left £30,851 (net personalty £15,120).

List of Manufacturers (*continued from page 470*)

Superlamp, Ltd., 6, Paul Street, E.C.2.
Synchronome Co., Ltd., 19, Caxton House, S.W.1.

Tellus Super Vacuum Cleaner, Ltd., 68, Victoria Street, S.W.1.
Terry, Herbert, & Sons, Ltd., Redditch.
Thermega, Ltd., 51, Victoria Street, S.W.1.
Thermics, Ltd., 392, Euston Road, N.W.1.
Thomas, Fredk., & Co., Ltd., Everton Buildings, Stanhope Street, N.W.1.
Thompson & Capper Wholesale, Ltd., Speke Hall Road, Liverpool.
T.M.C.-Harwell (Sales), Ltd., 233, Shaftesbury Avenue, W.C.2.
Toubkin, J., Faraday House, Todd Street, Manchester.
Tricity Cookers, Ltd., 125-130, Strand, W.C.2.
Troughton & Young, Ltd., 143, Knightsbridge, S.W.1.
Tucker, J. H., & Co., Ltd., King's Road, Tyseley, Birmingham.
Turnock, G., Ltd., 41, High Street, Birmingham, 6.
Typerlite Co., 86, Cannon Street, E.C.4.

Universal Boilers & Engineering Co., Ltd., Oxford Mill, Burnley.

Vactric, Ltd., Honeypot Lane, Stanmore, Middlesex.
Venner Time Switches, Ltd., Kingston By-Pass Road, New Malden, Surrey.
Vent-Axia Fans, Ltd., 9, Victoria Street, S.W.1.
Veritys, Ltd., Aston, Birmingham.
Vidor, Ltd., West Street, Erith.
Waite & Son, Ltd., 4, Cavendish Place, W.1.
Walker Fender Co., Ltd., Sherborne Street, Ladywood, Birmingham, 16.
Wandsworth Electrical Mfg. Co., Ltd., Imperial Works, Kenyon Street, Birmingham, 18.
Ward & Goldstone, Ltd., Frederick Road, Pendleton, Salford.
Watson & Sons (Electro-Medical), Ltd., Sunic House, 43, Parker Street, W.C.2.
Westinghouse Brake & Signal Co., Ltd., 82, York Road, N.1.
Westinghouse Electrical International Co., 2, Norfolk Street, W.C.2.
Whiteway Lighting, Ltd., 22, Bruton Street, Berkeley Square, W.1.
Wiggin, Henry, & Co., Ltd., Thames House, Millbank, S.W.1.
Wilkins & Mitchell, Phœnix Works, The Green, Darlaston.

Correspondence

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

A Change-over Question

I SHOULD like to have your readers' opinions regarding the position of a consumer and supply authority in the following circumstances. The consumer has a DC supply for all his motors and wishes to install another 50 HP motor. The undertaking informs him that the new motor must be AC and that an AC supply will be provided sufficient for all his present DC motors through a rectifier which it will supply and also for the new AC motor.

The undertaking also requires any additional or replacement motors to be AC. The consumer will thus have both DC and AC mains throughout his premises until such time as his existing DC motors are worn out or are replaced at his own expense. Under this arrangement he will have to re-wire his premises and purchase new control gear at his own expense to suit the undertaking.

If a rectifier is installed, can the undertaking demand space for it on the consumer's premises? Other places in the same town which have been changed over from DC to AC have all had new motors and the wiring altered to suit the AC supply, but this consumer has about forty motors and very extensive wiring on his premises and it would be expensive for the undertaking to change over in a proper way.

September 28th. INSTALLATION ENGINEER.

Lighting Considerations

It is only fair to your readers to comment on some of the points raised in Mr. G. V. Downer's letter in your issue of September 22nd, since it has been shown by recent events that almost any statement, if repeated sufficiently frequently and not denied, eventually comes to be regarded as having a basis of fact.

First, he evidently does not acept the "authoritative tables" of illumination values recommended in the I.E.S. Code and E.L.M.A. handbooks. These values are recommended as a result of world-wide experience; if he prefers to use his individual experience instead, that is entirely his own affair. It is, however, worth while noting that the "authoritative tables" mentioned above are recognised as such by the Government of the country.

Secondly it is, to say the least, extremely doubtful whether indirect light is to be preferred to direct light for the majority of factory work. A flood of oratory or literature may work wonders, but even so, few factory managers will allow themselves to be convinced that it is worth paying more money for half the quantity of light, which in any case is probably not of the quality required.

Thirdly, Mr. Robinson did not say that localised lighting is unnecessary in the daytime in textile mills. On the other hand, perfectly good evidence exists to show that benefical results may often be obtained by artificial lighting even during daytime; also that directional light in many instances is greatly to be desired since indirect light, or its daylight equivalent, does not have the required shadow content.

And so on; but finally the writer would draw attention to the word "ample" which occurs three times in Mr. Downer's letter. If he considers a certain level of illumination to be amply sufficient for certain purposes he is entitled to his opinion, but his opinion is not necessarily correct. Our aim should be a black-*out*, not black-*in*. L. S. B.

September 29th.

E.I.B.A. Plans

THE Electrical Industries Benevolent Association has made special plans to enable it to carry on its work during the war and every precaution has been taken to ensure that its machinery is as "shock proof" as possible. The loyal help of all its old volunteer workers and of many new ones will be needed, however, to keep this machinery running. Increased travelling difficulties create a need for more help in dealing with its case-work and the inevitable total loss of income from some sources calls for even more vigorous efforts on the part of its well-wishers to provide it with the funds it will need, particularly when the likely increase in the calls on its services is taken into consideration.

For instance the E.I.B.A. Year Book shows income of over £1,100 from social functions alone in 1938, which will be completely lost in 1939. All offers of help will be welcome and should be addressed to the Secretary, E.I.B.A., Unity Works, Welwyn Garden City, Herts.

Parliamentary News

By Our Special Reporter

Alternative Fuels

IN the House of Commons Mr. Silkin asked the Secretary for Mines whether, in fixing the fuel, heating, and lighting rations for householders and others, he would make provision for the interchangeability on a fixed scale of, say, gas or coal for electricity and *vice versa* at the householder's option for the benefit of those who might desire to economise by using one form of fuel or lighting instead of that previously used.

Mr. G. Lloyd said that the Fuel and Lighting Order, 1939, contained provisions whereby a householder might if he so desired, change either partially or wholly from one kind of fuel to another.

Restricted Street Lighting

On September 28th Mr. Lipson asked the Home Secretary if limited street lighting might be allowed in any town where it was possible to turn off all street lighting from a control switch immediately the necessity arose.

Miss Cazalet asked whether the Home Secretary had considered the present lighting system in Paris; and if he would consider adopting a similar system in London.

Sir J. Anderson said that in Paris the electric street lighting in the main thoroughfares was centrally controlled and could be extinguished at once when an air-raid warning was received. In this country only a very few towns had a system of street lighting so controlled that it could be extinguished at a moment's notice; and, even where this type of lighting was installed, he was not at present satisfied that the balance of advantage lay on the side of leaving the lights to be extinguished when a warning was received. The whole problem of lighting restriction was now, however, under review in the light of the knowledge gained during the first few weeks' experience of black-out conditions, and he hoped to be in a position to make the results of this review known in the near future.

Mr. Lipson asked what possible disadvantage there could be in allowing a town which had a central switch controlling the street lighting to have subdued lighting and to turn it off when there was an air-raid warning.

Sir J. Anderson said that there were arguments, which were entitled to weight, that could be put forward against the lighting of particular limited areas in the middle of larger areas which were completely obscured. There were also arguments against plunging people suddenly into darkness at the precise moment a warning was received. These were all matters on which there was something to be said on both sides.

Electricity in Madras

IN the State of Madras the principal suppliers of electricity are the Madras Electric Supply Corporation, Ltd., with plant of 53,750 kVA, and the Government, which operates the Pykara and Mettur hydro-electric schemes, of 23,400 kVA and 37,500 kVA, respectively. Recently extensions have been in progress at Pykara which will raise the capacity to 48,400 kVA by the installation of two 12,500-kVA generating sets, one of which has just been brought into operation and the other is to be commissioned within the next month or so. Moreover, industrial load development has been so extensive that the Government has put in hand the Papanasam hydro-thermal scheme which is designed to harness the power resources of the Tambraparni River in the Tinnevelly district, and at the moment the Kolab hydro-electric project which is designed to benefit both Orissa and Madras is being further examined.

For the extensions at Pykara—the Government's first enterprise in hydro-electric development the initial part of which was commissioned in 1932—a third pipe-line of larger dimensions (42 in. in diameter) has been constructed. Its total length from the surge tower to the power house is 10,000 ft. and its weight 3,000 tons. High-pressure valves of Glenfield and Kennedy manufacture which regulate the water supply at the power-house end are hydraulically operated and electrically controlled.

In order to accommodate the new units the power house has been extended by the addition of six bays; its total length is now 210 ft. and its width 54 ft. The structure has been designed to allow for a future extension constituting the third stage, which will probably be carried out in another five years. The gross operating head from the Glen Morgan forebay to the impulse wheels varies from 3,095 ft. to 3,065 ft., according to the storage in the reservoir. Each of the two Pelton wheels is coupled to a 12,500-kVA, 11-kV three-phase alternator, these units operating in parallel with the existing Met.-Vick. 7,800-kVA sets. Two new 11/110-kV, 12,500-kVA Met.-Vick. transformers have also been installed for stepping up to the transmission voltage.

NEW BOOKS

Trolley-bus Equipment. Light and Life. Radio Communication

How to Install Overhead Equipment for Trolley-buses. By D. J. HARTSHORNE. (Pp. 40; figs. 35.) Tramway and Railway World Publishing Co., Ltd., Shell Mex House, Victoria Embankment, London, W.C.2. Price 4s. 6d.

This booklet consists of a reprint of a series of articles which recently appeared in the *Tramway and Railway World*, and is based on experience, some of which was acquired on the London system. As the writer says, the installation of overhead equipment for a trolley-bus system has become a specialised branch of electrical engineering; he indicates the problems and suggests methods of dealing with them.

The contents are divided into four sections: erecting poles, layout and types of suspension, planning the wiring, estimating. The information is of a practical nature and the author has some useful suggestions to make. For instance, he advocates 1/400 scale for route plans to show pole positions, but $\frac{1}{8}$ in. to 1 ft. scale for curves and junctions. The importance of properly prepared plans cannot be overstressed if good operation is to be obtained.

On methods of erecting poles and getting overground obstructions and raking of poles, useful hints are given. Reinforcing poles to make them stand a heavier strain is advocated, but this is a fallacy. Reinforced poles are inclined to snap when a heavy vehicle collides with them, and the risk is far too great for the doubtful advantage of this economy.

Details are given of bracket arm construction and also of the latest device of putting a tube between the two poles; this is extremely useful and satisfactory where bridges and elevated roadways of ferro-concrete construction preclude the substitution of heavy poles for light ones.

Very useful suggestions are given on planning the routes; this is very important if the number of dewirements is to be kept down. The various fittings used are also dealt with in a thoroughly practical manner. There are a number of diagrams illustrating complicated layouts, reverses, &c. The book should prove of interest to engineers of any transport system which proposes to install trolley-buses and even the experienced tramway linesman will find many things that will make him reconsider his former practice. A complete list of items to provide for on a route is given and should be useful when estimating.—J. H. P.

An Introduction to Electrical Engineering. BY E. W. MARCHANT. (Pp. 297; illus.) Price: 12s. 6d. Methuen & Co., Ltd. 36, Essex Street, London, W.C.2.

This book is intended for students taking the first and second years at an engineering or technical college. It has evolved out of lectures, which is in its favour, for every educationalist knows that trying out a series of lectures is the best way to achieve an orderly arrangement of the subject. It is so easy just to copy the usual textbook arrangement, which is traditional and not necessarily the best.

This book departs from the usual sequence. For instance, Kirchhoff's Laws are described before resistances in series and parallel, and the three-wire system of supply is described before the simple theory of the condenser called a "capacitator." In fact, the arrangement of the book is good and the diagrams excellent. In dealing with units, the metre-kilogramme-second system confirmed at Torquay in 1938 is used throughout. This introduces new terms such as the "weber" and "newton" which may confuse older people.—W. R. C. C-A.

Light in Daily Life. By J. S. Dow. (Pp. 128.) Technical Press, Ltd., 5, Ave Maria Lane, London, E.C.4. Price 3s. 6d.

There must be very few whose business brings them in touch with the lighting industry who are unacquainted with Mr. J. Stewart Dow, the kindly honorary secretary of the Illuminating Engineering Society. Mr. Dow has a breadth of experience of the lighting industry which could scarcely be equalled by any of his contemporaries, and it is not surprising, therefore, that in his recently published book there is little cause for criticism and plenty for praise.

The essential merit of the work lies in the simplicity of style and language, which does so much to make a readable and fascinating story of the many applications of artificial light in the service of mankind to-day. This method of presentation, while lacking nothing in up-to-date detail, fits the book admirably for a very wide circulation and, indeed, one would like to see it adopted as a standard "primer" in all central and secondary schools.

Commencing with "Light in Civilisation," the book covers the subject in ten chapters, each of which has a well adjusted perspective and a commendably brief historic treatment. Every major field of lighting receives its fair meed of discussion. Street lighting ("The Lighting of the King's Highway") travels from the year 1415 to 1938 in less than ten pages, but in spite of this brevity most of the essential general knowledge information is there, thanks to the precision and clarity of the writing.

Lighting practice in factories, shops, homes, theatres, and transport is reviewed in an informative and non-technical manner, while in the last chapter on "Light in Time to Come," Mr. Dow allows himself the luxury of a cautious glimpse into the future (well supported by facts and figures from the present).

In this last section, which incidentally includes an attractive, if misleading, sub-heading "Night Life in London," it is certain that every electrically minded reader will be favourably impressed with the definite promise of substantial improvements in the efficiency of electric light sources in contrast with the entirely theoretical primary advance in efficiency which is tentatively suggested for the other type of source.

Perhaps the only disappointing feature in the book is the lack of half-tone illustrations; possibly other books on lighting have spoilt us with a lavish use of illumination. The line drawings with which the book is illustrated give at first sight an old-fashioned impression, although on the other hand Mr. Dow's pen pictures are really so well drawn as to permit him to dispense with numerous illustrations.—H. L.

Modern Radio Communications. By J. H. REYNER. Vol. 2. Third edition. (Pp. 255; figs. 141). Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 7s. 6d.

It is three years since the last edition of this book was published and the text has been expanded and in some places amended to include the latest developments. The first volume covers the requirements of the preliminary and intermediate grades of the City and Guilds examination, and this second volume deals with those of the final stage.

The text forms a concise outline of the fundamentals of radio engineering for the more advanced student, making use of only simple mathematics. It is a good up-to-date sketch of the whole subject, including the use of ultra-short waves and the principles of television. A few numerical examples are given after some of the chapters with answers at the end of the book, and the City and Guilds examination papers of 1934 and 1937 are reproduced.

This volume should be found useful, not only for the student, but also as a concise summary of fundamentals for the radio engineer.—C. G. C.

Electron Optics. BY L. M. MYERS. (Pp. 618; Figs. 379.) Price: 2 gn. Chapman & Hall, 11, Henrietta Street, London, W.C.2.

The subject of "electron optics" has developed rapidly within the last decade, principally owing to Busch's recognition of the focusing effects of electric fields on electron rays. The electric field acts as a medium of continuously variable refractive index in which the electron refraction and focusing effects take place.

Thus, most of the principles involved in geometrical optics find analogies in electron-optics, and we have electron mirrors, lenses, prisms, microscope and telescope as examples of this.

The culmination of its application to television through the cathode-ray tube has opened up wide fields for studies on electron behaviour under various conditions, and the subject is fascinating for both theoretical and experimental workers.

The present work, which is the first on the subject published by an Englishman, deals in a very thorough manner with both its theoretical and experimental aspects. The former, involves a good knowledge of mathematics up to degree standard, but even with this preparation the going will not be too easy.

The theoretical aspects offer a wide field of investigation involving the problems associated with electron motions in electric and magnetic fields. This automatically brings in the focusing effects of such fields. The thick lens effects associated with them introduce the "cardinal points" of such fields—these in turn lead to a consideration of the electron trajectory. All are dealt with in great detail for various lens combinations.

Having established the fundamental electron-optical principles, the author directs attention to practical applications such as the electron multiplier, and electron miscroscope, two of the most important scientific advances which have developed from the study of electron optics during the last decade.

His treatment on the descriptive side is lucid and clear. He writes with genuine enthusiasm for his subject which should be helpful to those working in similar or allied fields. His last chapter on "Further Applications" is perhaps the most stimulating in the whole book, particularly for those who already have some knowledge of the subject. The author has performed a most useful service in bringing together so vast a quantity of scientific work in this field. The book can be commended to the serious student of physics and electrical engineering.—L. J.

COMMERCIAL and INDUSTRIAL NEWS

Price Announcements. Export Credits Continued. New Cold-setting Compound. Aluminium and Non-ferrous Metals Control.

G.E.C. Service Arrangements

THE General Electric Co., Ltd., has circularised its customers setting out its arrangements to maintain its service during the period of hostilities. It points out that large stocks of commodities are held at its thirty-seven branches, while larger stocks will be maintained in the Home Counties.

The company states that while it will endeavour to maintain promises of delivery and will not increase prices unless circumstances make this necessary, it cannot accept liability in respect of delivery dates nor guarantee that the prices quoted at the present time will hold good when the order is executed. The status discount terms granted to any customer will be maintained until further notice.

All schedule prices existing prior to September 3rd have been withdrawn, and new schedules will be established as and when possible. The policy of the company is only to apply increases in prices in direct relation to increases in costs, and with the circular letter it has enclosed a price variation sheet giving price increases in force as at October 2nd. Further sheets will be issued as necessary. With one or two exceptions, the maximum increase shown on the sheet now issued is 10 per cent., and in many cases the increase is only 7½ per cent. The prices of many items remain unaltered.

An additional list giving the increased prices of radio receivers has also been issued. The new 10-valve superhet sets will remain unchanged in price.

New York Art Gallery Lighting

One of New York's most modern and completely functional buildings is the Museum of Modern Art recently opened at 11, West Fifty-third Street, just off Fifth Avenue. The lighting is of special interest because of its semi-flexibility. The ceilings of all exhibition galleries are dotted with mechanical studding and outlet boxes on five- and eight-foot centres. In each bay between columns are about twenty-five mechanical studdings and five outlet boxes so that trough lighting can be shifted when partitions are changed.

The partitions are semi-moveable, so that if it is desirable to revise the area of gallery section, both partitions and lighting can be moved. In moving the troughs, the electrician can break through the plaster at the required point and connect with a nearby outlet box attaching the trough to the studding with the toggle bolt. The troughs run in 5-ft. sections and carry "Birdseye" lamps of up to 150 W; this type has a silvered backing turning it into a spotlight. The illumination was designed out by McCandless & Kirk, replastering being avoided by having the studding exposed as part of ceiling design.

A new example of shadowless lighting at the New York Museum of Modern Art

American Machinery Imports

The imports of foreign electrical machinery and apparatus into the United States during the six months ended June last attained a value (at 5 dollars to the £) of £196,899 as compared with £199,969 in the corresponding half of 1938.

The Copper Development Association

The Copper Development Association announces that for the time being it will continue its usual activities. The staff has been reduced to some extent by the calling up of certain members for military service, and it may not be possible for all phases of the Association's work to be carried on as fully as hitherto. Nevertheless, every endeavour will be made to give continued service to all interested in the use of copper and copper alloys, to whom the resources of the Association remain available free of charge. Inquiries for information should be sent to the Association at its offices in Thames House, Millbank, London, S.W.1, from which address all its usual publications can still be obtained upon application.

Rapid Cable Jointing

Cold-setting compound has been developed for high-voltage jointing largely with a view to meeting wartime conditions, though it has found scope in many situations where the use of flame for heating ordinary compound is impermissible. In a publication entitled "Speed Cable Jointing in Electrical Transmission and Distribution," particulars relating to "Trinidite" No. 359-grade cold-setting compound are given by Dussek Bitumen and Taroleum, Ltd. We are informed that the compound can be used in standard metal cable boxes containing normally jointed conductors operated at 11-kV and under. For emergency purposes wooden cable boxes are used, those supplied for 11-kV joints measuring 32 by 9 by 10 in. for conductors up to 0.1 sq. in. and 36 by 9 by 10 in. for conductors up to 0.2 sq. in. These dimensions would be greater for higher voltages and for larger conductors.

The special compound consists of two fluids which after being mixed together for a minute can be poured in liquid form to penetrate to all parts of the box, setting into a plastic mass after a period long enough to ensure the rising and dispersal of air bubbles and the elimination of voids. Tests under B.S.S. conditions indicate a minimum dielectric strength, for 1 min. at 60 deg. C. between ½-in. spherical electrodes set 0.05 in. apart, of 15 kV. This is not quite so high a factor of safety as that obtained with good hot-pouring compound, It is, however, regarded as adequate for high-voltage joints, with suitable clearances, the cores being preferably staggered in a longitudinal plane. A low-resistance bond for the lead sheath or armouring is provided on each side of the joint. A non-setting waterproof cement, such as "Nozzet," or "Trinidite" plastic compound is used to make the box compound-tight during filling.

The design of the spreader centrally arranged in the cable box has done much to expedite the jointing of the cores. Through its middle pass metal rods protruding sufficiently on each side to permit the conductors to be secured to them. By the introduction of a tapeless joint the steep stress gradients occurring at the point of contact of compound and tape, owing to the wide variance in permittivities of the two, are avoided.

Export Credits

Mr. R. S. Hudson, Secretary to the Department of Overseas Trade, stated in the House of Commons last week that, generally speaking, the Exports Credit Guarantee Department was prepared to continue its existing arrangements for giving guarantees of sterling payment, that is, transfer risk in respect of exports of United Kingdom goods to most countries in Europe, excluding, of course, enemy territory. The countries in respect of which these facilities would be available and the amount of the Department's commitments at any time would be subject to review from week to week. In any case these guarantees would only be available for sales on cash terms or short terms of credit.

Canadian Battery Output

Sales by Canadian producers of electric storage batteries and parts during the second quarter of this year were valued at $851,017, against sales of $785,940 during the corresponding period of 1938, reports the Dominion Bureau of Statistics. Output included 150,080 batteries valued at $623,618 for internal-combustion engine starting and ignition; 1,852 motor cycle batteries at $7,794; 3,731 farm lighting cells at $22,339; 1,330 cells for railway service at $24,752: batteries for all other purposes at $85,712, and parts and supplies at $86,802. Imports of electric batteries of all kinds were valued at $89,957 and exports at $71,643, as compared with imports of $43,632 and exports of $89,531 for the second quarter of 1938.

Westinghouse Marketing Plans

Distributors and dealers handling Westinghouse refrigerators and domestic appliances have been informed that although imports of washing machines, dish washers and other domestic appliances have been suspended under the recent import ban, the company has large stocks of washing machines, dish washers and refrigerators, and is in a position to give immediate delivery of all lines while present stocks last. It is not anticipated that there will be any ban on the importation of

refrigerators. The stock position with regard to domestic appliances, particularly "Silver Arrow" irons and vacuum cleaners, is satisfactory. The company states that as far as present stocks are concerned it will endeavour to maintain existing prices. The company is continuing to market its range of "Service" refrigerators and has announced the introduction of three new models, WS-10, WS-10G and WS-12. These models are of improved design, model WS-10G being fitted with a glass display door and model WS-12 with an additional non-refrigerated storage compartment.

Fatality at Steelworks

A verdict of "accidental death" was recorded at the resumed inquest at Stewarts and Lloyds' offices on September 26th, on John Morrison (34), a labourer, who received a fatal electric shock at the company's steelworks on September 21st. Morrison, who was an employee of Stewarts & Lloyds, was working for the Mills Scaffolding Co. at the time of the accident, and was helping to erect scaffolding at the coke ovens. Dr. John Irving said that death was compatible with electric shock. Crawford B. Jamieson, iron and steel works labour officer, said the height of the scaffolding was 29 ft. from the ground. In answer to Mr. F. H. Mann, (Electrical Inspector of Factories, Birmingham), he said there were three live conductors carrying 440-V AC in the region of the scaffolding. Arrangements were made for men at work at the coke oven side of the structure to have the supply cut off. Witness was sure Morrison was aware of the danger of coming into contact with these conductors. Harry Welch, scaffolder, said he was working with Morrison, who stood on the lowest part of the scaffolding, close to the coke ovens, handing up fittings. Witness thought Morrison knew there were some live conductors three or four feet away. He turned and saw Morrison lying with his head on his arm on one of the live rails.

Publications to Continue

We are pleased to learn from the October issue of the "Standard News," the monthly magazine of the employees of Standard Telephones & Cables, Ltd., that it intends to continue publication. A similar statement has been made by the "M. & C. Apprentices' Magazine" (Mavor & Coulson, Ltd.).

Alleged Lighting Contract Fraud

Allegations of conspiracy to defraud the Bolton Corporation of large sums were made at Bolton in cases completed on September 29th. William Robinson, master tinsmith, 500, Chorley Old Road, Frederick Vose, 44, Homer Street, and Evan Cain, 154, Crook Street, all of Bolton, were committed for trial at Manchester Assizes, bail being allowed. Pleas of "not guilty" were entered. They were charged with conspiracy between February, 1936, and April, 1939. The cases concerned the Lighting Department. Counsel originally explained that in 1935 William Robinson, trading as Aaron Lever, Clifton Street, was given a contract to supply the Department with lamp frames. When electricity was substituted Robinson sen. received a sum of money for each lamp converted. It was alleged defendants so arranged matters as to make it appear that William Robinson sent to the department a greater number of frames than was actually the case. Six lamp frames were sent, but the delivery notes were made out for twelve or a larger number. Vose was yard foreman and Cain storekeeper. The system operated in the absence of the superintendent. It was alleged that by false entries over £500 of public money was wrongfully obtained.

Counsel said that in May, 1938, the suspicions of Joseph Thomasson, a painter, were aroused and by arrangement he noted deliveries. The superintendent then made a census of the street lamps and found that William Robinson had been paid for more 16-in. frames than there were in the town. Mr. H. Hamer, superintendent, stated that altogether 481 16-in. lamp frames with copper tops, and 155 18-in. frames were omitted from the stock cards. Mr. W. H. Goulding, defending, said that defendants had a complete answer.

Non-Ferrous Metal Control

The Minister of Supply has issued the Control of Metals (No. 3) Order dated September 24th (No. 1283). It revokes Article 1 of Order No. 997 relating to the purchase of non-ferrous metals and substitutes a requirement that no person shall acquire, or agree or offer to acquire, or invite an offer to dispose of any copper, lead or zinc situate in the United Kingdom on or after the date of the Order except under the authority of the Minister of Supply. Similarly, no person shall dispose of, or agree or offer to dispose of these metals without the Minister's authority. The article does not prohibit the delivering to, or acceptance by, a carrier or warehouseman in the ordinary course of business. The acquisition or disposal of the metals for the purpose of immediate repairs or renewals, provided that not more than one ton of each metal is required; for the performance of a contract entered into before September 1st; or the disposal or acquisition of scrap or swarf, &c., without its being subject to any process other than cleaning, crushing or grading, are not subject to licence requirements.

Aluminium Control

In pursuance of Regulations 55 and 98 of the Defence Regulations, 1939, the Minister of Supply has issued the Control of Aluminium (No. 3) Order, 1939, dated September 26th, 1939. This order brings together in one document, with some amendments, the provisions of the Control of Aluminium Order, 1939, and the Control of Aluminium (No. 2) Order, 1939, which are both repealed. The chief changes made in the new Order are in the paragraphs regulating the maximum prices for virgin aluminium alloys and secondary aluminium and aluminium alloys, where, while the formulæ regulating the maximum prices of these products in relation to virgin aluminium and alloy metals remain unchanged, provision is made for special maximum prices to be fixed by a direction of the Minister in certain cases. This is to meet the case of secondary aluminium or aluminium alloys of special composition or process of manufacture where the general formula has proved inapplicable.

Adjustments have been made in the prices of the alloyed metals on which the prices of alloys are to be calculated and amendments have been made in the definitions and the schedule of scrap prices. Copies of the Order may be purchased from H.M. Stationery Office, York House, Kingsway, London, W.C.2, or through any bookseller.

Temporary Removals

The head office of Edgar Allen & Co., Ltd., has been transferred to Eyam, near Sheffield (telephone: Eyam 31).

The address of G.W.B. Electric Furnaces, Ltd., is now Dibdale Works, Dudley, Worcs.

As from October 9th the head office of the Westinghouse Brake & Signal Co., Ltd., will be at Pew Hill House, Chippenham, Wilts (telephone: Chippenham 2255; telegrams: Fouracre, Chippenham).

The British Thomson-Houston Co., Ltd., announces that the Lamp Advertising Department is now at Bridle Path, Watford Junction, Herts (telephone: Watford 5811).

The Belgrave Electric Co., Ltd., has removed to Rowhurst Forge, Oxshott Road, Leatherhead, Surrey (telephone: 2546).

Davis Bros., Illuminating Engineers, Ltd., have removed to 179, Pasteur Gardens, London, N.18 (telephone: Palmers Green 7248).

The address of Siebe, Gorman & Co., Ltd., is now "Grangeclare," Park Lane, Ashtead, Surrey (telephone: Ashtead 42).

Until further notice the address of Stokes Appliances, Ltd., will be 23-5, George Street, Croydon (telephone: Croydon 2218).

"Punch" Autumn Number

Following the innovation of a special spring number, *Punch* has now published an autumn number. The sixteen pages in full colour went to press before the war, but the humour loses nothing in this respect, and the issue is an excellent shilling's worth of good cheer.

Industrial Lighting Equipment

A comprehensive catalogue has been issued by the British Thomson-Houston Co., Ltd., in which illustrated particulars are given of its range of "Mazdalux" industrial lighting equipment. This includes industrial reflectors, bulkhead and well-glass units, adjustable arm reflectors, handlamps, ultra-violet-ray equipment, accessories and spares, floodlighting projectors, light meters, control gear, and "Mazda" and "Mercra" lamps.

Scottish Lamp Order

The new British Luma electric lamp factory at Glasgow has received an order from Kinning Park Co-operative Society for 3,672 lamps. This is the largest individual order yet received from a Scottish retail society. The lamps, which are for ordinary lighting purposes, will be on sale at the society's branches.

Morphy-Richards' Policy

In an effort to standardise trading conditions during the war Morphy-Richards, Ltd., have issued to the distributing section of the electrical industry a statement as to their future policy, in which they announce that for the time being the extra cost of production is being borne by the company. Until such time as the rise in material costs becomes really serious, their retail prices will remain unaltered. It is proposed to stop immediately all preferential quantity discounts to dealers, and to allow one standard trade discount and the usual settlement discounts. Until further notice, wholesalers' discounts as already quoted remain unaltered.

Moffat Cookers and Refrigerators

Moffats, Ltd., inform us that for the present there will be no increase in their prices of cookers and refrigerators, although it may be necessary a little later on to increase prices to meet the higher cost of materials, &c.

New Municipal Showroom

The Nelson Town Council has received sanction to a loan for the purchase of 8, Manchester Road, as an electricity showroom.

French Electric Steel Production

The *Journal du Four Electrique* reports that a 15- to 18-ton electric arc furnace for the production of special steels has recently been installed by the Compagnie Electro-Mécanique, of Paris, at the Saint Jacques steelworks of the Chatillon-Commentry Co. A 20-ton electric furnace has also been built by the Alsthom Co. at the works of the same concern in the Department of Ariège; it is being used for the smelting of scrap iron. Two electric steel furnaces of the Ajax-Northrup

type have also recently been installed at the works of Jacob Holzer & Co.

Troughton & Young Arrangements

Troughton & Young, Ltd., have notified us of their wartime arrangements for continuity of service. The technical staff will be at 143, Knightsbridge, S.W.1 (telephone: Kensington 8881), and 6, Basil Street, S.W.3 (telephone: Kensington 7457). Night and emergency inquiries will be received at Putney 6106. The general offices, with skeleton technical staff, have been transferred to Birtley House, Bramley, nr. Guildford, Surrey (telephone: Bramley 3325). All correspondence should be addressed to 143, Knightsbridge.

Mining Electrical Engineers

The South Wales Branch Council of the Association of Mining Electrical Engineers has decided to curtail the number of meetings throughout the session, but in order to make every effort to keep the Branch together it has been decided to hold meetings in the early part of the session and other meetings later on in March and April. The first meeting will be held to-morrow (Saturday), when Mr. D. J. Thomas will deliver his chairman's address.

Cookery Demonstrations at St. Helens

Economy cookery demonstrations are now being given in St. Helens Corporation electricity showrooms. These are designed to give practical help in the wise use of electricity. As nearly as possible, menus are made up to deal with housekeeping problems which arise during war. Advice is given on the economical use of electricity for lighting, heating, washing, &c. The Department points out that economy need not be dull and irksome, and even in wartime electricity can rid housekeeping of drudgery.

Prices of Materials

Henry Gardner & Co., Ltd., report, October 4th: Copper bars (best selected) sheet and rod, £86, £1 decrease. English pig lead, English block tin, mercury and spelter, no change.

Edward Till & Co., report, October 4th: India-rubber, Para fine, no change.

Argentine Import Restrictions

With regard to the control of imports into Argentina, permits to import the following electrical goods during the second half of 1939 will be granted up to the total value imported by the applicant during the second half of 1938: Electric incandescent lamps, electric chandeliers and lamps, &c., electrical apparatus and implements, including those for household use and domestic installations (excluding those relating to machines).

Electricians' Wages

The National Federated Electrical Association informs us that in connection with the revised rates of wages for journeymen electricians due to take effect on the second pay day in October, for the pay period covered by that pay day, in accordance with the agreement, a revision in the rate for mates is also due; the present rate of 1s. 6¼d. per hour will be reduced to 1s. 6d. per hour.

For the information of electrical contractors and their employees we repeat the new rates which come into force next week: Grade A, 1s. 9¼d. per hour (subject to an addition of 5 per cent. making 1s. 10½d. per hour); Grade B, 1s. 7¼d. per hour. (The rate for the Mersey district, see Rule II of the working rules, is subject to an addition of 1d. per hour in lieu of travelling time.) Grade B2, 1s. 7d. per hour. Grade C, 1s. 6¼d. per hour. The new zoning agreement for the electrical contracting industry was published in our issue of June 30th (p. 943).

New Catalogues and Lists

B.E.N. Patents, Ltd., Hughenden Avenue, High Wycombe, Bucks.—An illustrated publication entitled "Painting by Modern Methods," describing selected items of the company's paint spraying plant.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Pamphlets relating to flameproof air-break gate-end switches (No. 867), flameproof air-break switchgear (No. 1056), cartridge and semi-enclosed type fuses (Nos. 932; 1016/3, 5, 6, 8, 9 and 12; and 1049/3) and type "LC" Holmes induction motors. Also an inquiry form for metal-clad unit-type distribution gear.

Batwin Electric Motors, Ltd., 138, Southwark Street, London, S.E.1.—A folder outlining the company's range of motors and self-priming pump units.

Simmonds Aerocessories, Ltd., Great West Road, Brentford.—A folder illustrating the use of Simmonds "Speed Nuts" for cooker, refrigerator, radio, automobile, &c., assemblies.

Alder Electrical Appliances, Ltd., Rushworth Street, Burnley.—A folder dealing with electric wash boilers and washing machines.

Simplex Electric Co., Ltd., Oldbury, Birmingham.—A folder relating to A.R.P. lighting equipment for docks, warehouses, &c.

Herbert Morris, Ltd., Loughborough.—Book No. 210 containing illustrations of Morris gravity conveyor installations.

Information Department

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

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ELECTRICITY SUPPLY

Chester Council and the Queensferry Project. Loan Problem at Corby. Johnstone Street Lighting Scheme to Proceed

Aberystwyth.—LOAN FOR PUBLIC LIGHTING.—Application is being made to the Ministry of Health for sanction to borrow £5,700 for a new scheme of public lighting.

Bedford.—PROTECTIVE APPARATUS.—The Electricity Committee is to protect the south-west rural ring main with over-current and earth fault relays, involving the installation of additional protective apparatus at certain sub-stations at a cost of £1,138.

Birkenhead.—LOAN FOR SUB-STATION EQUIPMENT.—The Electricity Committee has obtained sanction to borrow £2,000 of the £5,000 applied for in connection with sub-station equipment on the understanding that only works of a pressing nature will be undertaken

Brighton.—LAND FOR POWER STATION EXTENSION.—Having in view the possible extension of the Southwick power station, the Brighton Electricity Committee is applying for the consent of the Electricity Commissioners to borrow £10,050 to purchase land adjacent to the station.

The electrical engineer has reported the receipt of a direction from the Central Electricity Board for the extension of the station by the installation of a turbo-alternator set having a maximum continuous rating of 50,000 kW complete with boilers and necessary engineering works at the estimated cost of £741,000, now subject to variation owing to the war. The Electricity Committee has approved the direction, and has asked the Finance Committee how the expenditure is to be met. The latter Committee, however, recommends that the scheme shall be deferred.

Cardiff.—CONTROL OF STREET LIGHTING.—The electrical engineer has been asked to prepare a scheme for the control of the lighting of main thoroughfares and also an alternative scheme for the control of street lighting throughout the city from various points.

LOAN FOR SUB-STATIONS.—Application is being made for permission to borrow £10,000 for sub-stations.

PENARTH SUPPLY.—Owing to the war the Electricity Committee has deferred for the time being its application for a Special Order to include Penarth within its area of supply.

Chester.—COUNCIL DISCUSSES COMMISSIONERS' DECISION.—The City Council last week agreed to a recommendation that further advice should be taken upon the question of testing the decision of the Electricity Commissioners, who have refused the Council's application to borrow £397,280 for the extension of the Queensferry power station, although they admit that if consent were given the Corporation could meet the requirements of present and prospective demands at a cost less than that at which they could give a supply if they obtained it from the Central Electricity Board.

An amendment that the matter should not be pursued was lost by a large majority. Alderman Matthewson, chairman of the Electricity Committee, said it was a vital necessity that the Corporation should be allowed to proceed with this matter.

CENTRAL CONTROL SYSTEM.—The Electricity Committee has asked the City Council to approve of the installation by the Automatic Telephone & Electric Co., Ltd., of centralised remote control equipment for (1) controlling the air raid warning sirens; (2) controlling the supply to certain special consumers; (3) curtailing the demand by tripping switches at remote sub-stations; and (4) sending out call signals to control engineers and A.R.P working parties.

Clitheroe.—INCREASED SUPPLY TO QUARRIES.—J. Carter & Sons, quarry proprietors, have requested the Electricity Committee to provide additional supplies and application is to be made to the Electricity Commissioners for sanction to borrow £700 for a new sub-station and equipment.

Clydebank.—MAINTENANCE OF DOMESTIC APPLIANCES.—On the grounds that the cost of maintenance was too high it was recommended at the last meeting of the Town Council that electric cookers and wash boilers on the Council's housing estates should be replaced by gas cookers and boilers. According to the convener, the cost last year of repairing the cookers was £958, and that was less than the cost for one or two previous years, so that the Committee had no alternative but to decide as it had done. A lady councillor pointed out that she had had an electric cooker for eighteen months and it had not cost her a halfpenny for repairs. She thought that perhaps the type of electric cooker installed in these houses was not the right one. Other speakers held that the tenants favoured gas cookers. The matter is to be further considered.

Corby (Northants).—STREET LIGHTING LOAN DIFFICULTY.—The Urban District Council has asked the Ministry of Health for the earliest possible reply regarding a loan of £1,350 for public lighting services, this work having now been completed. It is feared that the loan will not now be granted owing to the war, and that the Council will have to raise the money.

Coventry.—ADDITIONAL SUPPLY.—The Electricity Committee reports having arranged terms for a special supply of electricity and is seeking sanction to borrow £58,400 in respect of mains, &c., for the purpose.

Douglas (I.O.M.).—INQUIRY INTO LOAN APPLICATION.—Mr. Bertram Kelly, electrical engineer to the Corporation, gave evidence at an inquiry into an application for permission to borrow £21,500 for mains extensions and services, cookers, meters, &c. After quoting figures of the growth of the electricity undertaking, he stated the average kWh used per consumer had risen from 938 to 992 per annum and the total sale was 10,650,000 kWh compared with 9,388,000 kWh in the previous year.

Edinburgh.—DEPARTMENT'S PROGRESS.—During the year ended May 28th last the Electricity Department sold 224.0 million kWh (excluding bulk supplies), an increase of 12.6 million kWh or approximately 6 per cent.; this was a slight improvement over the rate of increase in the previous year. Of the additional energy sold 6.5 million kWh was due to expansion under the "domestic heating" tariff, which incidentally covers cooking and other domestic uses. Total supplies of this type were 47.2 million kWh, and they now exceed the total lighting consumption (45.9 million kWh); in the previous year the respective totals were 40.7 million and 44.2 million kWh. The rate of increase in domestic heating last year of 16 per cent. compared with 9 per cent. in the previous twelve months. Another application which made good headway was the use of electricity for street and stair lighting, supplies of this type increasing by 20 per cent. to 7.1 million kWh. The Department's revenue aggregated £1,039,489 and working expenses £835,582, leaving a gross income surplus of £203,907. After meeting various charges there was a net profit of £58,081, which was transferred to reserve. Mr. E. Seddon, who has intimated his wish to retire next year, and Mr. J. Eccles sign the report as joint managers.

Eston.—SUPPLY TO ESTATE.—The U.D.C. Electricity Committee is to provide a supply to the South Bank estate at a cost of £1,500.

Gillingham.—ANNUAL ACCOUNTS.—The accounts of the electricity undertaking for the year ended March 31st last, a copy of which has been sent to us by Mr. H. Hall, borough electrical engineer, show a total income on revenue account of £110,435, an increase of £9,256 over the previous year. Expenditure rose by £2,770 to £92,301, and after deducting loan charges, &c., there was a net deficit of £2,539; this was an improvement over 1937-38, when there was a loss of £6,779. Total sales, excluding bulk supply to other authorised undertakings, amounted to 23.9 million kWh, an increase of 3.3 million kWh (16 per cent.).

Glasgow.—COOKERS IN SCHOOLS.—After hearing further information regarding a proposal that hired electric cookers in schools should be purchased, the Education Committee has decided that the hiring of the cookers should be continued and has instructed the director to arrange with the Electricity Department for the replacement of the older cookers by new models.

Halifax.—DISCONTINUANCE OF HIRE PURCHASE.—The Light, Heat & Power Committee has decided to discontinue, under present financial conditions, the 5 per cent. discount on electricity accounts, as from December 31st next, and that no new hire-purchase agreements for electrical appliances shall be entered into.

Ipswich.—SUB-STATION EXTENSIONS.—The Electricity Committee is to enlarge various sub-stations at a cost of £7,545. Application is being made for permission to borrow £15,000 for sub-station equipment.

Johnstone (Renfrewshire).—DECISION TO PROCEED WITH STREET LIGHTING SCHEME.—The Town Council has agreed to carry on with its new electric street lighting scheme. Recently the Renfrew Council came to a similar decision.

Manchester.—CABLE-LAYING.—The Electricity Committee has obtained sanction to borrow £100,000 for distributor and feeder mains. It has authorised an acceleration of the replacement of overhead networks on the Blackley and Gorton Mount estates.

Mansfield.—DISCONTINUANCE OF HIRE-PURCHASE SCHEME.—The Finance Committee has considered the sale on hire-purchase terms of electrical apparatus and recommends the temporary discontinuance of the scheme.

Morecambe.—LOAN.—The Electricity Committee is applying for permission to borrow £20,000 for mains and services.

Portland.—BULK SUPPLY CHARGES.—It is reported that the Electricity Commissioners have fixed the price to be charged by the Weymouth Corporation at £3 5s. per kW of maximum

demand in each of the years 1935, 1936 and 1937, and £3 5s. 1d. for 1938. The Commissioners have thus upheld the views of the U.D.C. as to the method of charging and for the four years in question a sum of £661 is repayable to the Council. On the present maximum demand the decision means an annual saving of approximately £250 to the electricity undertaking.

Preston.—LOAN FOR HIGH-VOLTAGE SCHEME.—Although the Electricity Commissioners are restricting capital expenditure during wartime, the Corporation's application for a loan in connection with extensions to the 33-kW Fylde Coast system is proceeding.

Ramsgate.—LOWER CHARGES.—It is announced that despite the war the Ramsgate and District Electric Supply Co., Ltd., now controlled by the County of London Electric Supply Co., Ltd., is to put into operation the recently authorised reduced charges for electricity.

Repton.—RURAL EXTENSIONS.—No objection is being raised by the Rural District Council to the proposed extensions of mains to Radbourne and Findern by the Derbyshire and Notts Electric Power Co., and to Repton and Lullington by Burton Town Council.

Russia.—SHALE-BURNING POWER PLANT.—The third five-year plan provides for the construction and putting into operation of 102 regional thermal power stations, learns *Reuter's Trade Service* from Moscow. One of the stations will be at Syzran. It will be of 24,000 kW and will use shale from the Kashpir mines. A boiler is to be installed at the station burning shale in the form of dust, the slack running off as a liquid. This method of removing the slack will enable the shale residue to be used as raw material for manufacturing building materials. Preparations have already begun for constructing the power station. Close by, a factory will be built for manufacturing building materials from the shale residue. The first section of the factory is to be put into operation towards the end of 1940. The station will supply electricity to the crude oil and petroleum refining industries.

Sheffield.—EMERGENCY EQUIPMENT IN HOSPITALS.—The Corporation is to provide emergency electrical equipment at the King Edward Hospital at a cost of £550 and at Lodge Moor Hospital (£350).

Shipley.—LOAN FOR EQUIPMENT.—Application is being made by the Electricity Committee for permission to borrow £14,525 for mains, sub-stations and meters.

Stalybridge.—ALTERED HIRE-PURCHASE TERMS.—Extensive changes in the terms under which it sells domestic electrical appliances are proposed by the Stalybridge, Hyde, Mossley and Dukinfield Joint Transport and Electricity Board. No further proposal forms for assisted wiring scheme installations are to be accepted until further notice. Hire-purchase of vacuum cleaners is to be suspended. On washing machines the £3 deposit and sixteen quarterly payments are amended to £7 10s. 6d. deposit and hire-purchase payments spread over two years. Hire-purchase terms for fires will be for twelve months. Wash boilers: Present terms of 2s. 2d. per quarter to be replaced by a deposit of £1 10s. and 3s. 3d. per quarter. Cookers: Present terms suspended until further notice, and replaced by a deposit of £2 10s. per quarter and hire-purchase spread over five years. Refrigerators: Present terms suspended and deposit increased from 5 per cent. to 20 per cent. of purchase price, and balance payable in three instead of five years.

Stirling.—CHARGES INCREASED.—The Burgh Electricity Department announces that the charges for electric lighting and power will be increased as from the autumn reading of meters. The new rates are:—Lighting, first 2,000 kWh. 4d. per kWh; second 2,000 at 3½d.; next 1,000 at 3d. and all over 5,000 at 2½d. Power and heating, first 200 kWh, 2d. per kWh; next 800 at 1d. and all over 1,000 at ¾d. Public lighting, 1d. per kWh.

MOTOR CONVERTOR INSTALLATION.—At a recent meeting of the Town Council it was stated that the Electricity Commissioners were satisfied generally from a technical standpoint in regard to the Council's proposal to install a motor convertor at the generating station, at a cost of £3,270, and would give favourable consideration to an application for loan sanction in this respect.

Walsall.—FRINGE ORDER.—The Wolverhampton Electricity Committee has raised no objection to the proposal of the Corporation to seek a Fringe Order to supply houses in the parish of Essington.

Warrington.—SUGGESTED POWER STATION SITE.—In connection with the proposal of the C.E.B. to establish two new power stations in the North-West England and North Wales area, the Corporation Electricity Committee is to inform the Electricity Commissioners that there is a selected station site in Warrington with adequate cooling water and siding facilities which is equivalent, if not superior, to the site proposed.

LOAN FOR MAINS AND SERVICES.—The Electricity Committee is applying for permission to borrow £20,000 for mains and services.

Wolverhampton.—SUPPLY EXTENSIONS.—The Electricity Committee is to carry out a number of mains extensions including the provision of a supply to new estates off Willenhall Road, at Bradmore and off Beech Road, Oxley; to Blackladies; to Ireton Lodge, Goldthorn Road; and to the Finchfield estate.

TRACTION

Blackburn.—TRAM ROUTE RETAINED.—The Transport Committee has decided not to place a contract for 15 buses for the Wilpshire tram route. The trams which it was intended to supersede will continue to run on this route.

Bristol.—TRAMS TO REMAIN.—In view of the rationing of petrol it has been decided not to proceed further with the scheme for changing from trams to buses until the war is over. Several routes have already been converted but from now on the remaining trams will continue in service.

Cardiff.—CONVERSION SCHEME POSTPONED.—The Transport Committee has decided not to proceed with the acceptance of tenders for trolley-buses and overhead equipment in connection with the proposed conversion of the tramway system to trolley-bus operation.

London.—FLOODGATES IN TUBE TUNNELS.—Electrically operated floodgates are being installed at Waterloo and Strand on the Northern Line tube railway. As a temporary precaution concrete bulkheads have been constructed; these will be removed as soon as the floodgates are in position, and normal train services will then be restored. Floodgates have already been installed on the Bakerloo Line.

South Shields.—COST OF ELECTRICITY FOR TRANSPORT.—Mr. H. J. Troughton, transport manager to the Corporation, in his annual report refers to the fall in the net profit from £12,743 to £3,793, and states that one of the main reasons for the fall was higher capital charges. He also considered that the cost of electricity was too high. The increase in 1938-1939 might have been due to special causes, but it was undoubtedly partially due to the undertaking paying on a maximum demand system. If capital charges and conversion losses were added, the cost per DC unit was well over 1d.—one of the highest in the country. During the year trams, trolley-buses and motor-buses carried 23,375,584 passengers, an increase of 2,198,371. The total revenue was £115,054, an increase of £10,826, while expenditure increased by £19,776 to £111,261.

COMMUNICATIONS

Great Britain.—LINKING RELAY EXCHANGES WITH B.B.C. STUDIOS.—The possibility of linking radio relay exchanges by land lines with B.B.C. studios has been under consideration by the Post Office. Under present conditions the Post Office sees no prospect of being able to provide lines to provincial relay exchanges generally or on any considerable scale, although it may be able to meet individual applications from operators whose exchanges are near a B.B.C. studio. The rent for the lines would have to be calculated separately in each case and would approximate to the ordinary private wire tariff with special consideration to any case where a line served more than one exchange. The Post Office has already provided emergency lines for certain of the London relay companies, and has authorised Western Wireless Relay to negotiate with the B.B.C. regarding the provision of a connection with a studio. It is emphasised by the Post Office that any action taken at this stage must not be regarded as prejudicing in any way the general question of providing land-lines between relay exchanges and B.B.C. stations, under special provisions in regard to rental, which has been the subject of discussion between representatives of the relay industry and the Post Office.

The Post Office Telecommunications Department is prepared to assist radio relay operators in certain circumstances during the present emergency. The release of vehicles commandeered by the local authorities may be effected, and difficulties in obtaining supplies of wire for maintenance purposes overcome. Telephone wires used in connection with relay exchanges have been placed on an emergency list for repairs.

Japan.—1,800-MILE TELEPHONE CABLE COMPLETED.—A *Reuter* report from Tokyo states that the completion of the task of laying a telephone cable between Tokyo and Mukden, Manchukuo—a distance of some 1,800 miles—was celebrated in Tokyo Central Telephone Office. The cable took six years to lay and cost a sum estimated at about £2,300,000.

Rumania.—MORE TELEPHONES.—An increase of over 12,000 in the number of telephones in use in Rumania during last year is reported in *Foreign Communication News*. At the end of 1938 the total number of instruments in use in the country was 93,300, of which 73 per cent were automatically operated.

Modified Street Lamps

MR. P. J. ROBINSON, city electrical engineer of Liverpool, has sent to the Ministry of Transport new types of street lighting fittings which conceal lamps that provide a useful guide for traffic, yet cannot be seen from above. A specially designed cover has been fitted to each lamp from which only a slit of light is emitted and there is no reflection. Each is surmounted by a large circular cover to conceal the light above a modest height.

FINANCIAL SECTION

New Companies. Returns of Capital. Debenture Charges. Bankruptcies and Liquidations. Reports of Electrical Companies. Dividend Announcements. Stocks and Shares

New Companies Registered

Winstan Radio & Electrical Co., Ltd.—Private company. Registered September 28th. Capital, £1,000. Objects: To carry on the business of electrical, wireless and mechanical engineers, contractors and merchants, dealers in radio and television apparatus, manufacturers and repairers of and service engineers for all classes of neon signs and lamps, &c. Permanent directors: E. Winstanley, 230, Bolton Road, Salford, 6, and F. Hutchinson, 433, Plodder Lane, Farnworth, Lancs. Registered office: 230, Bolton Road, Salford, 6.

Swansea Auto-Electrical Engineers, Ltd.—Private company. Registered September 18th. Capital, £1,000. Objects: To carry on the business of manufacturers and repairers of, agents for and dealers in batteries, magnetos, dynamos, armatures, motors, &c. Directors: G. E. Jeffreys, C. R. Jeffreys, and T. R. Jeffreys, all of 19, Glanbrydan Avenue, Uplands, Swansea.

Linoprovæ Relief Photography, Ltd.—Private company Registered September 21st. Capital, £1,000. Objects: To carry on the business of relief and other photography in all its branches, electricians, electrical and radio engineers, contractors and repairers, &c. Directors: G. Stephenson, Star and Garter Hotel, Putney, S.W.15, and four others. Registered office: 13, Lower Richmond Road, S.W.15.

Companies' Returns

Statements of Capital

Public Utilities (Electric), Ltd.—Capital, £25,000 in £1 shares. Return dated July 13th. All shares taken up. £25,000 paid. Mortgages and charges nil.

Isle of Arran Electric Light & Power Co., Ltd.—Capital, £20,000 in 1,000 preference and 19,000 ordinary shares of £1. Return dated July 13th. 1,000 preference and 17,700 ordinary shares taken up. £17,500 paid on 17,500 ordinary shares, £1,200 considered as paid on 1,000 preference and 200 ordinary shares. Mortgages and charges nil.

Wholesale Electric Co., Ltd.—Capital, £1,500 in £1 shares. Return dated July 18th. All shares taken up. £1,500 paid. Mortgages and charges nil.

E. Saunders (Margate), Ltd.—Capital, £3,000 in £1 shares. Return dated July 14th. 30 shares taken up. £30 paid. Mortgages and charges nil.

Rangoon Electric Tramway & Supply Co., Ltd.—Capital, £1,000,000 in 250,000 preference, 550,000 ordinary and 200,000 new shares, all of £1. Return dated May 12th. 250,000 preference and 550,000 ordinary shares taken up. £735,000 paid on 250,000 preference and 485,000 ordinary shares, £65,000 considered as paid on 65,000 ordinary shares. Mortgages and charges: £200,000.

E. K. Cole, Ltd.—Capital, £650,000 in 250,000 5½ per cent. 1st cumulative preference and 200,000 7 per cent. cumulative participating preferred ordinary shares of £1 and 800,000 ordinary shares of 5s. Return dated June 22nd. 250,000 1st preference, 184,480 preferred ordinary and 745,600 ordinary shares taken up. £520,220 paid on 250,000 1st preference, 184,480 preferred ordinary and 342,960 ordinary shares, £100,660 considered as paid on 402,640 ordinary shares. Mortgages and charges nil.

Montevideo Telephone Co., Ltd.—Capital, £220,000 in £1 shares. Return dated July 5th. 217,135 shares taken up. £217,135 considered as paid. Mortgages and charges nil.

Metropolitan Electric Cable & Construction Co., Ltd.—Capital, £150,000 in 120,000 ordinary shares of 10s. and 90,000 preference shares of £1. Return dated July 20th. All shares taken up. £59,900 paid on 119,800 ordinary shares, £90,100 considered as paid on the remainder. Mortgages and charges nil.

Chadburns (Ship) Telegraph Co., Ltd.—Capital, £120,000 in £60,000 ordinary stock and 60,000 shares of £1. Return dated July 25th. All ordinary stock taken up. £60,000 paid. Mortgages and charges nil.

Chislehurst Electric Supply Co., Ltd.—Capital, £50,000 in £1 shares. Return dated March 21st (filed July 21st), 1939. 40,000 shares taken up. £30,000 paid, £10,000 considered as paid. Mortgages and charges nil.

St. Helens Cable & Rubber Co., Ltd.—Capital, £100,000 in £1 shares. Return dated April 17th. 84,000 shares taken up. £84,000 paid. Mortgages and charges nil.

Colvern, Ltd.—Capital, £30,000 in £1 shares. Return dated July 20th. All shares taken up. £2,500 paid, £27,500 considered as paid. Mortgages and charges nil.

British Electric Traction Co., Ltd.—Capital, £2,998,397 15s. in 712,744 5s. 6 per cent. cumulative participating preference stock, £1,326,263 10s. 8 per cent. non cumulative preferred ordinary stock, £718,865 deferred ordinary stock, and 240,525 ordinary shares of £1. Return dated June 30th. All stock taken up. £2,046,007 15s. paid, £711,865 considered as paid. Mortgages and charges: £1,638,701 12s. On July 14th, 1939, a further 71,887 deferred ordinary shares of £1 were allotted as fully paid up.

Costa Rica Electric Light & Traction Co., Ltd.—Capital, £130,000 in £1 shares. Return dated July 3rd. All shares taken up. £7 paid, £129,993 considered as paid. Mortgages and charges: £223,400.

Christy Brothers & Co., Ltd.—Capital, £225,000 in £75,000 preference and £150,000 ordinary stock. Return dated July 24th. All stock taken up. £176,083 paid, £48,917 considered as paid. Mortgages and charges nil.

Aron Electricity Meter, Ltd.—Capital, £350,000 in £1 shares. Return dated July 24th. 151,936 shares taken up. £104,660 15s. paid on 75,968 shares (including premiums of 7s. 6d. per share on 75,773 shares and 28s. 6d. on 195 shares), £75,968 considered as paid on 75,968 shares. Mortgages and charges nil.

Weald Electricity Supply Co., Ltd.—Capital, £1,000,000 in £1 shares. Return dated March 28th (filed July 21st). All shares taken up. £671,000 paid (£1 on 346,000 shares and 10s. on 650,000 shares), £4,000 considered as paid on 4,000 shares. Mortgages and charges nil.

Mortgages and Charges

Flather & Co., Ltd.—Satisfaction in full on July 4th, 1939, of mortgage dated July 3rd, 1919, and registered July 14th, 1919, and a transfer thereof dated July 4th, 1922, and registered July 12th, 1922. (According to the register of mortgages, the mortgage registered July 14th, 1919, originally secured £4,400.)

Painton & Co., Ltd.—Mortgage on land and premises at Kingsthorpe, Northants, with fixtures, &c., dated September 15th, 1939, to secure all moneys due or to become due from the company to the Midland Bank, Ltd.

Diamond Lamp Shade Co., Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated August 18th, 1939, to secure £1,000 inclusive of £700 already registered. Holder: G. E. Baskerville, 69, Bridge Street, Manchester.

Increases of Capital

Asbestoline, Ltd.—The nominal capital has been increased by the addition of £19,900, beyond the registered capital of £100. The additional capital is divided into 79,600 ordinary shares of 5s. each.

B.X. Plastics, Ltd.—The nominal capital has been increased by the addition of £150,000, beyond the registered capital of 450,000. The additional capital is divided into 150,000 6 per cent. cumulative preference shares of £1. British Xylonite Co., Ltd., were allotted 449,994 fully paid shares on December 30th, 1938, and 150,000 fully paid shares on August 31st, 1939.

Company Liquidation

Quadrant Carbon & Metal Products, Ltd.—Particulars of claims by October 31st to the liquidator, Mr. E. G. Cribb.

Bankruptcy Proceedings

C. F. Adams and **F. Harris** (trading as Swift Bros.), electrical engineers, 351, Forest Road, Walthamstow.—The receiving order in this case was made on the petition of Lighting Trades, Ltd., creditors for £287, and on September 26th the first meeting of creditors was held at London Bankruptcy Buildings before Mr. V. Armstrong, Assistant Receiver. The debtors stated that they commenced the business in 1921 with a joint capital of £100 and attributed their failure to inability to recover book debts due to the firm. The liabilities are estimated at £900 against assets £10, apart from bad book debts, £900. The Official Receiver will wind up the estate in bankruptcy.

A. Hitner, 7, Linden Grove, Fallowfield, Manchester, electrical engineer and radio dealer.—This debtor applied for his discharge on September 25th at the Court House, Quay Street, Manchester, when it was stated that the receiving order had been made in 1937. The liabilities totalled £4,509 and the assets had realised £196. The Official Receiver reported that in December, 1934, debtor and another formed a limited company called Telsen Sales, Ltd., to purchase the Telsen Electric Company, Ltd., of Birmingham. Negotiations were concluded in May, 1935, the profit of £26,000 being equally divided between them. By February, 1936, the Universal Electric Co., Ltd., of which debtor had control, was in financial difficulties, and a receiver was appointed in January, 1937. It was estimated that debtor lost £12,000 of his own money in the company as well as a large claim for salary due to him. The discharge was granted, subject to twelve months' suspension.

C. R. H. Douse (Clifford Radio), radio dealer, 118, Sneinton Dale, Nottingham. Trustee, Mr. F. W. Flint, 5, Regent Street, Nottingham, released August 24th.

S. C. Green, lately wireless dealer, 215, The Broadway, Southall, Middlesex.—Receiving order made September 21st on a creditor's petition.

P. W. Penty (Sackville Electrical Co.), electrical contractor, 38, Mannville Terrace, Morley Street, Bradford.—Last day for receiving proofs for dividend October 11th. Trustee, Mr. W. F. Cresswell, 71, Manningham Lane, Bradford, Official Receiver.

R. G. Littlewood (Littlewoods), radio specialist, 19, Burnt Ash Road, Lee Green, London, S.E.12.—Last day for receiving proofs for dividend October 10th. Trustee, Mr. C. R. Waterer, 195-208, Waterloo Road, London, S.E.1, Official Receiver.

Reports and Dividends

Ferranti, Ltd., report a net profit for the year to June 30th of £79,383, an increase of £11,120, as compared with 1937-38. It is proposed to pay a dividend of 6 per cent., tax free for the year, equivalent to 9.2 per cent. gross with tax at 7s. In addition, £7,388 is being distributed *pro rata* to ordinary stockholders from capital profit realised on the sale of investments. For 1937-38 the dividend was 6 per cent., less tax, on the £300,000 of ordinary capital.

Associated Fire Alarms, Ltd., reports a net profit for the year ended June 30th of £3,360, as compared with £2,996 for the preceding year. The directors propose to maintain the dividend at 6 per cent., and to carry forward £2,541 against £1,411 brought in.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK EXCHANGE markets are settling down gradually to wartime conditions. The fact that all bargains nowadays must be done for cash only is naturally a handicap to business, and imposes a severe restraint upon any kind of speculation. Maintenance of minimum prices continues. Until some step is taken to defreeze the position in the gilt-edged markets, with a view to introducing a greater liquidity into British Government and similar securities, it is idle to look for any spread of general activity in the Stock Exchange.

Satisfactory Figures

Dividend announcements in the electrical groups are well maintained. Ferranti, the electrical equipment manufacturers, make an excellent showing with an increase in net profit for the year of £11,100. The ordinary dividend of 6 per cent. is to be paid tax free, instead of less tax, as was the case a year ago. The ordinary shares are privately held. British Thermostat has declared an interim dividend of 7½ per cent. less tax, against 6¾ per cent. a year ago. The India Rubber, Gutta Percha & Telegraph Works announces the same dividends as before; that is, 6 per cent. on the preference and 3 per cent. on the ordinary.

Cables Investment Trust reports a net revenue of £219,000, being about £21,000 down on the year. The dividend is maintained at 5 per cent. as before. The Trust, now in its fifth year, took over in July, 1935, various investments of Cable and Wireless (Holding). The 4½ per cent. redeemable preference shares stand at 19s. 6d.; the 3½ per cent. debenture is quoted at 85.

Dividend Forecasts

With the Budget provisions known, it becomes a little less difficult to assess the possibilities in connection with dividend payments in respect of the current twelve months. Naturally enough, a good deal of vagueness still exists, and must continue to do so for some time to come. An endeavour is being made, however, to arrive at a rough idea of how new taxes are likely to affect companies in the electricity supply group.

Reference to our table will show that in the first group of prices dividends on the ordinary shares range from 2½ per cent. on West Gloucestershire shares, to 15 per cent. on Bournemouth and Poole. The average rate lies between 7 and 8 per cent. in the cases of the well-established concerns. Of the London companies, Metropolitan pays 10 per cent. and 2 per cent. bonus. County of London has been paying 10½ per cent. for years past.

Variations in Yields

An impression prevails that the majority of companies may reduce their dividends to some small extent, though not in sufficient degree to make appreciable difference to the yields that can now be obtained from the leading ordinary shares at to-day's prices. These yields vary a good deal, as our list shows. On Northampton ordinary, for instance, the return is £4 17s. per cent., while on London Associated it is nearly 7½ per cent. West Gloucestershire, which can scarcely be regarded as a typical example, pay little more than 3 per cent.

The yields on these electricity supply shares have been, for years past, distinctly modest as compared with those obtainable from shares in other industrial concerns. For this the reason is that the electric lighting industry has won such respect from the investor that he accepted a low rate of return in order to obtain the security that the shares offer. In the cases of the provincial companies, the attraction has been, new issues of shares offered at bonus prices.

County of London have rallied to 29s. 6d. and Clyde Valley to 30s. There are falls in British Power & Light, Northmet ordinary, Midland Counties, London Associated and London Electric. The market as a whole is very quiet.

Gilt-edged

The gilt-edged market's interest in the Government's borrowing intentions received little enlightenment from the Chancellor's Budget speech. All that transpired in this connection was that loans will be raised—when the time is considered ripe—in a variety of forms to suit investment needs of all kinds. As regards the size of the loans, it was learnt that borrowing is to provide for about half this year's £2,000 millions expenditure.

E.P.T. appears as a big brother to A.P.D. This Armaments Profits Duty was to be levied only on profits from armament work on a big scale. The new duty, on the other hand, covers incomes over the full field of trade and industry. The rate of 60 per cent., however, and the level above which profits are counted as "excess" are the same. When A.P.D. was introduced, this latter standard was considered lenient. In most cases the basis can be calculated on the profits of 1935 or 1936, or on the average of either of those years with 1937. This means that for a great many companies the liability applies only when profits have surpassed a decidedly respectable height: which will make it easier for dividends to be maintained at around pre-war rates.

Tax-free Dividends

Another point for attention, in connection with the rise in income-tax, relates to companies which make it their practice to pay dividends free of income tax. Where fixed-interest stocks or shares are concerned, prices are automatically adjusted to the new rates. In the case of dividends on ordinary shares, however, it is scarcely to be expected that—even with other things equal—a company will maintain the same distributions per cent. after paying a much increased proportion of earnings to the Exchequer. In the ordinary way, companies pay income-tax only on undistributed earnings; ordinary dividends are declared subject to tax, which is shown deducted in the dividend warrant. Consequently, a change in the rate calls, in itself, for no change in gross dividend rates; but it creates uncertainty about future tax-free dividends. In the electrical groups, ordinary dividends are usually paid free of tax by, for instance, Ericsson Telephones, certain of the overseas electricity supply undertakings such as the Calcutta, Madras and Palestine electricity companies, and by Oriental Telephone and the Globe Telegraph Trust. The first-named company, incidentally, has just declared a 6 per cent. tax-free interim dividend, the same rate as last year's.

Price Fluctuations

On hopes that the Home Railways will receive considerate treatment in the forthcoming Government proposals, Southern Railway 5 per cent. preferred has risen 8 points to 60. The 5 per cent. preference is unchanged at 80. Amongst Cable and Wireless stocks, the tendency is still dull, the 4 per cent. incomes being 2½ lower at 87½. In sympathy, Globe ordinary and preference are 1/16 down. Anglo-American Telegraphs have weakened. Western Union holds the gain of 10½ secured last week.

Equipment and manufacturing shares are heavy, though the list of falls is less lengthy than that of a week ago. International Combustion and Callenders have fallen 7s. 6d.; Westinghouse Brake and British Insulated, 5s. A number of others are down, but Tube Investments show 1/16 rise at 73s. 9d. and English Electrics are similarly better at 26s. 3d. Cromptons hardened to 15s.

"Emmies" Results

Last year's experience of the radio and kindred trades had prepared Electric and Musical Industries shareholders for some such showing as is now presented in the company's preliminary statement for the year ended on September 30th. The net loss of £132,000 is a figure slightly smaller than the previous year's profit, but is struck after the making of special provision for wartime contingencies. No dividend is to be paid. A year ago the distribution was halved, at 5 per cent., but was less than half-covered by earnings.

It is generally supposed that the radio manufacturers will be among the first and most successful in finding active wartime employment for plant rendered idle by the falling off in demand for the normal products. The price of "Emmi" shares is unchanged at 7s. 6d. E. K. Cole ordinary are lower at 3s.

Financial Section (*Concluded from previous page*)

Reports and Dividends—contd.

Cables Investment Trust, Ltd., reports an income for the year ended June 30th of £344,384, a decrease of £25,172 as compared with the preceding year. Expenses, interest and tax amounted to £125,125, leaving a net revenue of £219,259 (against £240,841). The ordinary dividend for the year is maintained at 5 per cent. by the final payment of 3 per cent., and the balance carried forward is increased by £29,259 to £97,733.

Electric & Musical Industries, Ltd., reports a net loss for the year to September 30th, subject to audit, of £131,968. This, it is stated, includes special provision for exceptional contingencies due to the international situation. No ordinary dividend is proposed. For 1937-38 a net profit was made of £146,496 (against £313,964), and a dividend of 5 per cent., less tax, was paid.

J. & F. Stone Lighting & Radio, Ltd., is paying the dividend on the 6 per cent. preference shares which would normally have been paid on September 30th, but was deferred pending consideration of the accounts for the year to June 30th now in course of audit.

Erinoid, Ltd., has decided to pay no ordinary dividend for the year to July 31st. In the previous year an interim dividend of 2 per cent. only was paid.

The Sun Electrical Co., Ltd., is paying a dividend of 2½ per cent. for 1938-39 (against 5 per cent. for the previous year).

Ericsson Telephones, Ltd., has announced an interim dividend of 6 per cent., tax free (same).

The British Oxygen Co., Ltd., has declared an interim dividend of 7 per cent., actual, the same rate as last year, less tax, at 7s.

The Hendon Electric Supply Co., Ltd.—In accordance with the Northmet Power Act, 1939, the electricity undertaking of the Hendon Electric Supply Co., Ltd., became vested in the Northmet Power Co. on September 30th, 1939.

G. D. Peters & Co., Ltd. have announced an interim dividend of 15 per cent., less tax at 7s. This compares with an interim payment of 10 per cent., less tax, last year.

The India Rubber, Gutta Percha & Telegraph Works Co., Ltd., is paying a fixed dividend of 6 per cent., plus an interim dividend of 2 per cent., on the preferred ordinary shares (same) and a fixed dividend of 6 per cent. and an interim of 3 per cent. on the ordinary shares (same).

The British Thermostat Co., Ltd., is paying an interim dividend of 7½ per cent., less tax (against 6¾ per cent.).

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1939 High-est	1939 Low-est	Dividend Pre-vious	Dividend Last	Price Oct. 3	Rise or Fall	Yield £ s. d.
Home Electricity Companies							
Bournemouth and Poole	68/3	58/6	15	15	58/9	—	5 2 0
British Power and Light	30/9	22/–	7	7	22/–	–1/–	6 7 3
City of London	33/9	24/6	7½	7½	24/6	–1/–	6 2 5
Clyde Valley	37/9	27/6	8	8	30/–	+½	5 6 8
County of London	46/9	28/–	10½	10½	29/6	+⅛	7 2 4
Edmundson's:							
7% Pref.	31/6	27/6	7	7	28/6	—	4 18 3
Ord.	27/9	18/6	9	6	18/6	–6d.	6 9 9
Elec. Dis. Yorkshire	41/6	33/9	9	9	33/9	—	5 6 8
Elec. Fin. and Securities	47/9	40/–	12½	12½	40/–	—	6 5 0
Elec. Supply Corporation	51/9	41/–	12	12	41/3	—	5 16 0
Isle of Thanet	20/–	15/–	4	4	15/–	—	5 6 8
Lancs Light and Power	34/6	27/6	7½	7½	27/6	—	5 9 0
Llanelly Elec.	22/6	18/–	5½	5½	18/–	—	6 2 3
Lond. Assoc. Electric	30/–	18/9	7	7	18/9	–9d.	7 9 4
London Electric	34/3	26/3	7	7	26/3	–1/6	5 6 8
London Power Deb. Red.	106½	98	5	5	98½	—	5 1 6
Metropolitan	51/–	35/–	12	12	35/–	—	6 17 2
Midland Counties	38/9	30/–	8	8	30/–	–2/–	5 6 8
Mid. Elec. Power	41/9	35/–	8	9	35/–	—	5 2 10
Newcastle Elec.	28/9	26/–	7	7	26/3	—	5 6 8
North Eastern Electric:							
Ordinary	32/3	23/6	7	7	23/6	–6d.	5 19 2
7% Pref.	32/6	27/6	7	7	27/6	–6d.	5 1 10
Northampton	48/–	41/–	10	10	41/3	—	4 17 0
Notting Hill 6% Pref. (£10)	12½	11½	6	6	11½	—	5 4 4
Northmet Power:							
Ordinary	46/6	30/6	10	10	30/9	–⅛	6 10 0
6% Pref.	29/–	23/6	6	6	24/6	+⅛	4 18 0
Richmond Elec.	29/–	23/6	7	7	23/9	—	5 18 0
Scottish Power	38/9	28/6	8	8	28/9	—	5 11 4
Southern Areas	22/9	18/–	5	5	18/–	—	5 11 3
South London	30/9	23/9	7	7	23/9	—	5 18 0
West Devon	23/3	18/9	5	5	18/9	—	5 6 8
West Glos.	21/3	16/3	2	2½	16/3	—	3 1 6
Yorkshire Elec.	38/6	28/9	8	8	28/9	—	5 11 4
Overseas Electricity Companies							
Atlas Elec.	4/3	1/6	Nil	Nil	1/6	—	—
Calcutta Elec.	30/–	25/–	10*	10*	25/6	+6d.	—
Cawnpore Elec.	34/6	28/3	10	10	28/3	—	—
East African Power	26/3	20/–	7	7	20/–	—	7 0 0
Jerusalem Elec.	24/6	21/–	7	7	21/–	--	6 13 4
Kalgoorlie (10/–)	10/6	9/6	7½	7	10/–	—	7 0 0
Madras	31/–	21/3	8*	8*	21/3	—	—
Montreal Power	35½	30	1½	1½	31	—	—
Palestine Elec. "A"	29/6	20/–	7½*	5*	20/–	—	5 0 0
Perak Hydro-electric	18/9	13/6	7	6	16/3	—	7 7 8
Shawinigan Power	23½	20	85cts.	83cts.	22	—	—
Tokyo Elec. 6%	61	37	6	6	39½	—	15 4 0
Victoria Falls Power	73/9	60/–	12½	15	61/3	—	4 18 0
Whitehall Investments Pref.	19/6	12/6	7½	7½	12/6	—	12 0 0
Public Boards							
Central Electricity:							
1950–70	112	103	5	5	103	—	4 17 1
1955–75	115½	104½	5	5	104½	—	4 15 8
1951–73	106½	101	4½	4½	101	—	4 9 0
1963–93	95½	84	3½	3½	84	—	4 3 4
London Elec. Trans. Gtd.	88½	83	2½	2½	83	—	2 19 6
London & Home Counties							
1955–75	107½	105	4½	4½	105½	—	4 5 6
Lond. Passenger Transport:							
A	114½	103	4½	4½	103	—	4 7 5
B	117½	102	5	5	102	—	4 18 0
C	83½	64½	4½	4	65	—	6 3 1
West Midland Joint Elec.,							
1948–68	112½	104½	5	5	104½	—	4 15 8
Telegraph and Telephone							
American Tel. & Tel.	198	159	9	9	195	—	4 12 4
Anglo-Am. Tel.:							
Pref.	101½	89½	6	6	90	–1½	6 13 4
Def.	23⅜	19	1½	1½	20	–1	7 10 0
Anglo-Portuguese	24/–	17/6	8	8	17/6	—	9 2 10
Cable & Wireless:							
5½% Pref.	95½	75	4½	5½	78½xd.	—	7 0 0
Ord.	55	34	4	4	45½	—	8 16 0
Income	100	87½	—	—	87½	–2½	4 11 5
Canadian Marconi $1	5/6	3/9	—	Nil	5/6	—	—
Globe Tel. & Tel.:							
Ord.	31/3	23/6	7½*	7½*	25/–	–½	6 0 0
Pref.	26/9	22/6	6	6	22/6	–⅛	5 6 8
Great Northern Tel. (£10)	38	27½	20	20	28	—	7 7 10
Inter. Tel. & Tel.	10½	5½	Nil	Nil	6	—	—
Marconi-Marine	30/–	23/–	7½	10	25/–	—	8 0 0
Oriental Telephone Ord.	2½	46/3	12*	12*	2⅞	—	4 16 0
Radio Corpn.	8⅞	5½	8	6	7½	—	—
Telephone Props.	14/–	12/9	5	6	13/9	—	8 14 6
Telephone Rentals (5/–)	10/–	7/–	10	10	7/–	–3d.	7 2 10
Western Union	40½	19½	2½	—	40	—	—
Traction and Transport							
Anglo-Arg. Trams:							
First Pref. (£5)	7/6	3/6	Nil	Nil	3/9	—	—
4% Inc.	16	7	Nil	Nil	5½	–2	—
British Electric Traction:							
Def. Ord.	1025	515	5	5	515	–35	—
Pref. Ord.	164	130	8	8	130	–10	5 6 3
Bristol Trams	52/6	36/3	8	10	36/3	–⅛	5 10 4
Brazil Traction	13	7½	$1	50c.	7½	–½	—
Calcutta Trams	25/6	20/9	8	8	20/9	—	7 14 3
Cape Elec. Trams	18/–	16/9	5	6	17/–	—	7 1 2
Lancs Transport	37/9	30/–	10	10	30/–	—	6 13 4
Mexican Light:							
1st Bonds	25	20	5	5	20	—	—
Rio 5% Bonds	81	47	5	5	60	–5	8 6 8
Southern Rly:							
5% Prefd.	75½	48	5	5	60	+8	8 6 8
5% Pref.	90½	79	5	5	80	—	6 5 0
T. Tilling	2½	33/9	10	10	33/9	—	5 18 6
Tilling & B.A	54/6	43/9	10	9*	43/9	—	4 2 3
West Riding	37/9	30/–	10	10	30/–	–⅛	—
Equipment and Manufacturing							
Aron Electricity Ord.	32/3	28/9	15	15	30/–	—	10 0 0
Assoc. Elec.:							
Ord.	45/3	31/3	10	10	31/3	—	6 8 0
Pref.	36/6	31/3	8	8	31/3	—	5 2 5
Automatic Telephone & El.	47/6	39/3	10	12½	40/–	—	6 5 0
Babcock & Wilcox	48/–	37/–	10	12½	42/6	—	5 17 8
British Aluminium Ord.	58/9	48/9	12½	12½	51/3xd.	–3/–	4 17 6
British Insulated Ord.	88/–	72/6	20	20	72/6	–½	5 10 3
British Thermostat (5/–)	16/–	12/–	18½	18½	13/9	—	6 14 7
British Vacuum Cleaner (5/–)	22/6	12/6	40	40	12/6	–½	—
Brush Ord.	5/9	4/6	Nil	Nil	4/9	—	—
Callender's	92/–	52/6	20	15	52/6	–¾	5 11 3
Chloride Elec. Storage	82/3	62/6	20	15	3½	—	4 12 4
Consolidated Signal	96/–	75/–	36½	36½	75/–	—	9 14 8
Crabtree (10/–)	25/6	17/6	17½	17½	17/6	—	10 0 0
Crompton Parkinson:							
Ord. (5/–)	21/–	12/6	12½	15	15/–	+⅛	—
E. K. Cole (5/–)	9/–	3/–	10	Nil	3/–	–6d.	—
Elec. & Musical Industries (10/–)	14/9	7/6	10	5	7/6	—	6 18 0
Electric Construction	38/6	30/6	12½	13½	35/–	—	7 14 3
Enfield Cable Ord.	58/6	45/–	25	16½	45/–	–½	7 4 5
Electrical Switchgear (10/–)	27/–	23/9	16	16	23/9	—	6 14 9
English Electric	36/6	25/–	10	10	26/3	+⅛	7 12 4
Ensign Lamps (5/–)	16/9	13/9	—	25	15/9	—	7 18 3
Ericsson Tel. (5/–)	43/–	35/–	25*	25*	35/9	–½	3 11 5
Ever Ready (5/–)	24/–	18/–	35	30	22/–	–6d.	6 16 4
Falk Stadelmann	27/–	17/6	10	6	17/6	–⅛	6 17 2
Ferranti Pref.	25/6	22/6	7	7	23/–	--	6 1 9
G.E.C.:							
Pref.	31/9	26/3	6½	6½	26/3	—	4 19 2
Ord.	82/–	61/3	17½	20	61/3	–½	6 10 9
Greenwood & Batley	27/6	22/6	7	15	22/6	—	13 6 8
Hall Telephone (10/–)	22/3	19/3	15	15	20/–	—	7 10 0
Henley's (5/–)	21/–	16/3	20	20	16/3	—	6 3 1
4½% Pref.	23/–	21/–	4½	4½	21/3	—	4 4 8
Hopkinsons	46/3	37/3	12½	15	38/9	—	7 15 0
India-Rubber Pref.	21/3	18/9	5½	5½	18/9	—	5 17 4
Intl. Combustion	120/–	97/–	32½	32½	5½	–¾	6 7 0
J. Lucas	60/–	48/3	15	15	48/9	–¼	6 3 0
Johnson & Phillips	41/3	32/–	12½	12½	36,3	—	6 17 10
Lancashire Dynamo	72/–	57/6	25	25	57/6xd.	—	8 14 0
Laurence Scott (5/–)	12/–	9/6	15	15	9/6	—	7 18 4
London Elec. Wire	31/6	28/6	12	7½	28/9	—	5 4 4
Mather & Platt	50/–	41/3	13½	13½	41/3	—	6 11 3
Metropolitan Elec. Cable Pf.	21/3	21/–	5½	5½	21/3	--	5 3 6
Murex	85/9	63/9	20	20	75/–	–6d.	5 6 8
Pye Deferred (5/–)	13/9	7/6	25	25	7/6	–6d.	16 13 4
Revo (10/–)	35/6	25/–	17½	17½	25/–	—	7 0 0
Reyrolle	61/–	52/6	12½	12½	55/–	—	4 11 0
Siemens Ord.	26/9	20/–	7½	7½	20/–	—	7 10 0
Strand Elec. (5/–)	5/6	3/3	5	10	3,3	–6d.	15 7 8
S. Smith (1/–)	9/–	6/–	37½	50	6/3	—	8 0 0
Switchgear & Cowans (5/–)	15/–	10/–	20	20	10/–	—	10 0 0
Telegraph Condenser (10/–)	7/6	5/–	5	—	7/6	+3d.	—
Telegraph Construction	2½	37/3	10	10	38/9	—	5 3 1
Telephone Mfg. (5/–)	10/–	7/3	9	9	7/3	–9d.	6 4 2
Tube Investments	91/–	72/6	23½	23½	73/9	+⅛	6 9 3
Vactric (5/–)	4/3	2/3	10	4	2/3	—	8 18 0
Vickers (10/–)	24/6	14/6	10	10	14/9	—	6 15 7
Ward & Goldstone (5/–)	22/6	19/6	20	20	19/9	—	5 1 3
Westinghouse Brake	54/9	37/6	17½	17½	37/6	–½	9 6 8
Walsall Conduits (4/–)	31/9	21/3	55	55	31/3	–½	10 7 0
West, Allen (5/–)	7/6	5/9	7½	10	5/9	—	8 14 0

* Dividends are paid free of Income Tax.

NEW PATENTS

Electrical Specifications Recently Published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1937

33071. "Control of electric winding-engines and the like." British Thomson-Houston Co., Ltd., T. H. Petch, Jun., and H. W. C. Liddiard. November 30th, 1937. (512237.)

36040. "Prepayment meters." Gemeente Electriciteitswerken Amsterdam. December 29th, 1936. (512056.)

1938

2380. "Gaseous electric-discharge devices." H. J. Reed, A. J. Mayne and J. B. Ward. January 25th, 1938. (512318.)

2734. "Coil-winding machines." C. H. Bomback, and Automatic Coil Winder and Electrical Equipment Co., Ltd. January 28th, 1938. (512058.)

2997. "Vapour electric convertors." General Electric Co., Ltd., and E. Gallizia. January 31st, 1938. (512320.)

5959. "Magnetic separators." H. H. Thompson, A. E. Davies and M. D. Thompson. February 25th, 1938. (512241.)

6024. "Magneto-strictive devices and electrical and electro-mechanical systems therefor." Standard Telephones and Cables, Ltd. (Western Electric Co., Inc.). February 25th, 1938. (512242.)

6282. "Electron-discharge devices." Marconi's Wireless Telegraph Co., Ltd. February 27th, 1937. (512245.)

6465. "Modulated carrier-wave transmitters." Marconi's Wireless Telegraph Co., Ltd. March 19th, 1937. (512065.)

6577. "Vapour electric arc convertor arrangements." General Electric Co., Ltd., and H. H. Taylour. March 2nd, 1938. (512247.)

6595. "Electric transformers." British Thomson-Houston Co., Ltd. March 2nd, 1937. (512151.)

6626. "Thermionic oscillation generators." Telefunken Ges. für Drahtlose Telegraphie. March 2nd, 1937. (512325.)

6819. "Thermionic valve circuits." Baird Television, Ltd., and P. E. A. R. Terry. March 4th, 1938. (512327.)

6848. "Method of manufacturing a selenium rectifier." Standard Telephones and Cables, Ltd. (Nippon Electric Co., Ltd.) March 4th, 1938 (Convention date not granted.) (512252.)

6891. "Superheterodyne receivers." Marconi's Wireless Telegraph Co., Ltd., J. F. Ramsay and A. L. Oliver. March 4th, 1938. (512253.)

7482. "Electrical condensers." S. G. Brown. March 10th, 1938. (Cognate application 22502/38.) (512153.)

7882. "Electric arc convertor arrangements." General Electric Co., Ltd., J. W. Gibson and W. G. Thompson. March 14th, 1938. (512155.)

8084. "High-capacity electric fuses." A. C. Macqueen, N. Care and H. Blades. March 16th, 1938. (Cognate application 7599/39.) (512156.)

8402. "Electric motor control systems." General Electric Co., Ltd., and E. H. Croft. March 18th, 1938. (512333.)

8903. "Gas-tight seals wherein electric conductors pass through quartz and like vitreous material." General Electric Co., Ltd., and K. G. Schnetzler. March 23rd, 1938. (512257.)

9489. "Electric unit-driven printing-presses." H. V. James, H. Taylor and H. Yates. March 28th, 1938. (512337.)

9653. "Insulated electrical conductors and method of making same." Electrical Research Products, Inc. April 14th, 1937. (512338.)

11148. "Apparatus for conditioning or purifying air by means of high-tension electric discharge." J. F. C. Prosser and H. K. Prosser. April 12th, 1938. (512165.)

11449. "Electric fires." Ferranti, Ltd., and W. V. Butterfield. April 14th, 1938. (512167.)

14141. "Tuning of radio receivers." E. K. Cole, Ltd., and H. A. Brooke. May 12th, 1938. (512348.)

14189. "Thermionic valves." M-O Valve Co., Ltd., and G. W. Warren. May 12th, 1938. (512268.)

14378. "Thermionic valve circuits." Mullard Radio Valve Co., Ltd., and C. C. Eaglesfield. May 13th, 1938. (512173.)

14530. "Quartz and like seals." General Electric Co., Ltd., and V. J. Francis. May 16th, 1938. (512270.)

16189. "Removable contact arrangements for electric switches." J. A. Crabtree and Co., Ltd. (Schiele Industriewerke.) May 31st, 1938. (512176.)

16242. "Means for controlling the excitation of dynamo-electric machines." English Electric Co., Ltd., and H. S. Carnegie. May 31st, 1938. (512350.)

17006. "Apparatus for absorbing the secondary rays in X-ray photography." P. Kamm. June 8th, 1938. (512277.)

17179. "Gas-filled electric incandescent lamps." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 12th, 1937. (512083.)

17851. "Incandescent-cathode current-converting discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 18th, 1937. (512084.)

18107. "Method for manufacturing a highly active depolariser from natural pyrolusite." Leclanché Soc. Anon. June 23rd, 1937. (512179.)

18177. "Electric high-pressure metal-vapour discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 21st, 1937. (Addition to 427293.) (512180.)

18918. "Manufacture of electric incandescent lamps." Vereinigte Glühlampen und Elektrizitats Akt.-Ges. June 26th. 1937. (512281.)

19088. "Telephone systems." General Electric Co., Ltd., J. A. Tweats, and A. F. Jones. June 28th, 1938. (512354.)

20090. "Processes for improving the stability to temperature-change of sparking plug insulators." R. Bosch Ges. July 9th, 1937. (512185.)

20144. "Electric furnaces adapted for the bright-annealing of metals and like purposes." General Electric Co., Ltd., C. J. Smithells, and S. V. Williams. July 7th, 1938. (Cognate application 23353/38.) (512357.)

20755. "Remote control of radio receivers." Soc. Anon. Fimi. July 14th, 1937. (512085.)

20756. "Superheterodyne receivers." Soc. Anon. Fimi. July 15th, 1937. (512284.)

20838. "Trolley pole bases for overhead electric traction vehicles." Brecknell, Willis and Co., Ltd., and A. M. Willis. July 13th, 1938. (512359.)

21157. "Electric motor control systems." British Thomson-Houston Co., Ltd. July 16th, 1937. (512361.)

21837. "Wheel-operated contact devices for railway axle-counting apparatus." O. Block and J. Bing. July 23rd, 1937. (512191.)

22615. "High-pressure metal-vapour electric-discharge devices." General Electric Co., Ltd., and J. W. Ryde. July 29th, 1938. (512286.)

22962. "Electric motor control systems." British Thomson-Houston Co., Ltd. August 5th, 1937. (512195.)

27183. "Electrolytic apparatus for producing hydroxides of metals." E. Munekata. September 17th, 1938. (512366.)

31498. "Sintered permanent magnets, and method of manufacturing same." Metallges. Akt.-Ges. February 7th, 1938. (512375.)

32649. "Vacuum cleaners." British Thomson-Houston Co., Ltd. November 10th, 1937. (512382.)

33350. "Electrical condensers." E. Kleinmann, and A. Mendel. November 16th, 1937. (512102.)

33584. "Amplifier systems." Standard Telephones and Cables, Ltd., December 31st, 1937. (512209.)

35389. "Electric communication systems." Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. December 4th, 1937. (512108.)

36150. "Electrical circuits controlled by pulses, suitable for use in television." A. D. Blumlein and E. L. C. White. December 24th, 1937. (Cognate application 12342/38. (Divided out of 508377.) (512109.)

36336. "Number rollers for metering mechanisms, especially for electricity measuring appliances." Landis and Gyr Akt.-Ges. July 20th, 1938. (512385.)

37073. "X-ray tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. December 22nd, 1937. (Cognate application 37074/38.) (512388.)

1939

317. "Electrical precipitation of suspended particles from gaseous fluids." Lodge Cottrell, Ltd. (Siemens-Lurgi-Cottrell-Elektrofilter-Ges. für Forschung und Patentvertung.) January 4th, 1939. (512224.)

873. "Crates, boxes, or cartons for carrying wireless valves, cathode tubes, and other fragile articles." A. Astley. January 11th, 1939. (512116.)

969. "Bearings of electrical regulating or control devices." Elektrische Glühlampenfabrieken J. Kremenczky Akt.-Ges. January 12th, 1938. (512226.)

1232. "Permanent brake magnets of high coercive force." Landis and Gyr Akt.-Ges. December 3rd, 1938. (512227.)

1498. "Amplifiers with automatic contrast control." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. January 19th, 1938. (512118.)

2062. "Electro-mechanical frequency compensating device for wireless transmitting and receiving apparatus. Soc. Anon. Fimi. January 28th, 1938. (512121.)

3147. "Sockets for electric lamps and the like." British Thomson-Houston Co., Ltd. January 28th, 1938. (Addition to 500411.) (512123.)

3577. "Terminals for electrical condensers and like apparatus." P. A. Sporing, C. P. Johnson, and Telegraph Condenser Co., Ltd. February 3rd, 1939. (512124.)

4072. "Direction finding radio receivers." Telefunken Ges. für Drahtlose Telegraphie." February 7th, 1938. (512304.)

4539. "Gas-blast electric switches." British Thomson-Houston Co., Ltd. February 12th, 1938. (512400.)

9369. "Electric distribution systems." J. M. Hollander. March 25th, 1939. (512312.)

9739. "Electrical precipitation of suspended particles from a stream of gas." Lodge-Cottrell, Ltd. (Research Corporation of New York.) March 28th, 1939. (512313.)

10842. "Mast aerials." J. Gollnow (trading as U. Sohn J. Gollnow.) April 8th, 1938. (512136.)

12539. "Temperature compensation of Ferraris meters." Landis and Gyr Akt.-Ges. July 29th, 1938. (512315.)

17695. "Radio receiving sets." D. J. Crowley. December 4th, 1936. (Divided out of 508580.) (512141.)

17953. "Electric resistance heaters." A. Whitaker, J. B. Stevenson, P. W. Lockwood and N. Barnes. January 25th, 1938. (Divided out of 512319.) (512412.)

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Australia.—BRISBANE. — October 11th. Electrically driven pumping unit comprising pump, motor, discharge column in well, shafting and control gear, &c. Department of Irrigation, Water Supply and Sewerage, Executive Buildings, George Street, Brisbane. (T. 26172/39.)*

City Council. October 27th. One three-phase, 17,500-kVA transformer. (T. 26873/39.)*

October 24th. City Electric Light Co., Ltd. Paper insulated, lead-covered cables. (T. 26907/39.)*

November 8th. Four 500-kVA transformers. (T. 27252/39.)*

PERTH.—November 2nd. Western Australia Government Tender Board. Supply and delivery of two 500-kW mercury arc rectifiers, switchgear, feeders, control system, &c. (T. 26439/39.)*

SYDNEY.—October 17th. Posts and Telegraphs Department. Lead sheathed cable. (T. 26613/39.)*

October 24th. Lamps, lamp caps and sockets. (T. 26617/39.)*

Loading carrier coils, &c. (T. 26806/39.)*

MELBOURNE.—October 31st. Posts and Telegraphs Department. Transmitters and parts. (T. 27227/39.)*

INGHAM (QUEENSLAND).—November 6th. Hinchinbrook Shire Council. Crude-oil engine and alternator. (T. 27418/39.)

Brighton.—Corporation. October 16th. Civil engineering works in connection with the augmentation of the circulating water system at Southwick power station. Specifications from Mr. W. N. C. Clinch, engineer and manager.

Cardiff.—October 18th. King Edward VII Welsh National Memorial Association. X-ray equipment for (a) the South Wales Sanatorium, Talgarth, Brecknockshire, and (b) the Brynseiont Hospital, Caernarvon. F. J. Alban, Memorial Offices, Cathays Park.

Dewsbury.—October 12th. Electricity Department. 11,000-V metal-clad switchgear. (September 29th.)

Dundee.—October 11th. Electricity Department. Multi-core low-voltage paper-insulated, lead-covered and armoured cable. (September 22nd.)

Egypt.—CAIRO.—October 18th. Extension of the electrical network at Damietta. Municipalities Department. (T. 26152/39.)*

Eire.—KILKENNY.—October 7th. County Board of Health and Public Assistance. Electric cooking equipment for the County Hospital, Kilkenny. Forms from J. V. Downes, 53, Fitzwilliam Square, Dublin (deposit £3 3s.).

Hastings.—October 12th. Electricity Department. 110-V secondary battery having a capacity of 350, 450 or 500 Ah, complete with trickle charger and motor generator charging plant. (September 22nd.)

India.—NEW DELHI.—October 26th. Cotton and silk covered and enamelled copper wires required for the year ending February 28th, 1941. (T. 26947/39.)*

Ipswich.—November 21st. Corporation. Steel-frame buildings for boiler and turbine house, and a 110-ton and other electric overhead travelling cranes at the new Cliff Quay power station. (See this issue.)

London. — BATTERSEA. — October 31st. Electricity Department. One 30,000-kW turbo-alternator and ancillary plant, and two 180,000 lb. boilers and ancillary plant. (September 29th.)

Manchester.—October 19th. Electricity Committee. 3-phase, 4-wire 400/240V-AC sub-station switchgear for twelve months ending December 31st, 1940. (See this issue.)

October 19th. Electricity Committee. Supply for twelve months ending December 31st, 1940, of AC electric fan motors. (September 29th.)

New Zealand.—WELLINGTON.—November 14th. Supply of 50-kV, three-phase, outdoor switchgear and steelwork complete with insulators and accessories. (T. 26179/39.)*

November 21st. Public Works Department. Protective relays for 110-kVA transmission lines. (T. 26821/39.)*

Sheffield.—October 10th. Electricity Department. Automatic fire-fighting equipment for switch-houses at Neepsend power station. (September 22nd.)

November 7th. Electricity Committee. Auxiliary 11-kV three-phase, 150-MVA switchgear. (See this issue.)

Skipton.—Wiring of forty-one houses on the Burnside estate for conversion from gas to electric lighting. Details from K. B. Robinson, engineer and surveyor, Town Hall. Tenders to J. P. Horne, Clerk to the Council.

South Africa.—JOHANNESBURG. — November 17th. City Council. 33-kV switchgear and auxiliary plant. (T. 25663/39.)*

November 20th. Railways and Harbours Administration. Superheater elements. (T. 26975/39.)*

WINDHOEK.—October 18th. Municipality. Two AC generators. (T. 26700/39.)*

Uruguay.—MONTEVIDEO.—October 11th. State Electricity Supply and Telephones' Administration. Lead-covered telephone cable. (T.26931/39.)*

November 10th. 300,000 metres of telephone cable. (T. 26933/39.)*

Orders Placed

Bedford.—Electricity Committee. Recommended. Sub-station equipment at Biddenham (£490), switchgear for Gloucester Road sub-station (£650) and switchgear for Shakespeare Road sub-station (£1,604).—Ferguson, Pailin. Circuit-breaker for Allhallows Lane sub-station (£247).—B.T.H. Co. Five-panel, 6,600-V switchboard (£831).—Metropolitan-Vickers Electrical Co.

Birmingham.—Education Committee. Accepted. Emergency generator sets at Handsworth junior technical college (£374) and Bordesley Green junior technical college (£275), and electric mains at Cropwood open-air school (£115).—H. Pratt, Ltd.

Burton-on-Trent.—Electricity Committee. Accepted. Two 15,000-kW turbo-alternators and ancillary plant (£114,188). —Brush Electrical Engineering Co., Ltd. Four boiler units and ancillary plant (£208,149).—Babcock & Wilcox.

Cardiff.—Electricity Committee. Accepted. Fire protection apparatus for Sandon Street sub-station (£1,909).—Mather & Platt. Switchgear for Roath power station (£4,442). — Whitehead Switchgear & Inventions. Two 33-kV reactors (£1,770 each) and one 6.6-kV reactor (£605).—Hackbridge Electric Construction Co.

Chester.—Electricity Committee. Recommended. Centralised remote control switching equipment (£3,050).—Automatic Telephone & Electric Co.

Durham.—County Education Committee. Accepted. Electrical installation at the Shildon Council School (£454).—R. Robson, Willington.

Glasgow.—Transport Committee. Accepted. Cable.—Scottish Cables.

Manchester. — Electricity Committee. Accepted. Switchgear-operating batteries and charging equipment.—Alton Battery Co.—Sub-contractor for generators and switchboard.—Metropolitan-Vickers Electrical Co.

Morecambe.—Electricity Committee. Recommended. Fire protective equipment (£692).—Pyrene Co.

Salford.—Electricity Committee. Recommended. Transformers (£1,500).—General Electric Co. Fire apparatus for Blackfriars sub-station (£385). — Atlas Sprinkler Co.

Sheffield.—Watch Committee. Accepted for twelve months. Lamp pillars (£2 18s. 6d. each) and extension pieces (4s. 6d. each).—Moorwoods, Ltd.

Electricity Committee. Accepted. Control diagram and fittings for control room in Commercial Street (£1,259).—Automatic Telephone & Electric Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Police building (£8,000), radiology department at Woodend Hospital, and fire station; city architect.

Arundel.—Houses (18), Fitzalan Road; L. R. Richardson.

Barnard Castle.—Alterations and improvements to Institution for Durham County P.A.C.; county surveyor, 43, Old Elvet, Durham. Houses at Evenwood; North-Eastern Housing Association, Northumberland Road, Newcastle-on-Tyne.

Banstead.—Licensed premises, Chipstead Valley Road, Woodmansterne, for Watney, Combe Reid & Co., Ltd.; A. Blomfield, staff architect.

Birkenhead. — Infants' department, Holy Cross school; Education Committee.

Birmingham.—Houses, Manor Park, Springfield Road, Castle Bromwich; H. Turley, builder, 178, Brooklands Road, Birmingham. Factory and offices, for Ether, Ltd.; S. J. Smith & Co., Ltd., contractors, Corporation Street, Birmingham. Houses, Springfield Road, Castle Bromwich; Hales & Co., builders, Whateley Hall Estate, Castle Bromwich.

Blackpool.—Extensions to works, for Cheswick and Wright; S. Kerfoot & Son, contractors, 62, Bryan Road, Blackpool.

Bolton.—Extensions to works, for Bolton Gate Co., Ltd.; R. Watson & Son, Ltd., contractors, High Street. Additions to works for St. Paul's Worsted Mills, Ltd. Houses (10), Chelford Avenue; W. Crank.

Bristol.—Garage, for Henleys, Ltd.; Cunningham and Gibaud, architects, All Saints' House, Exchange, Bristol.

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TRADE MARK APPLICATIONS

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from the dates mentioned.

September 20th.

Noma. The Spirit of Festivity (lettering and design). No. 608266. Class 11 (IV). Electric decorative lighting devices employing electric lamps. Noma Electric Co., Ltd., Sarsfield Road, Perivale, Greenford, Middlesex.

September 27th.

Manganamron. No. 607952. Class 9 (IV). Wire for electrical purposes made from manganese compounds. The Scott Insulated Wire Co., Ltd., Queensland Works, Westmorland Road, Queensbury, London, N.W.9.

Bromyard (HEREFORDSHIRE).—Cinema, for B. Longfield, proprietor of the "Plaza" Cinema; Herbert Skyrme, architect, 138, Widemarsh Street, Hereford.

Bushey.—Factory, for Energen Foods Co., Ltd.; Gilbert and Partners, architects, 15, Elizabeth Street, London, S.W.1.

Buxton.—Houses (20), Ladmenlow; H. Robinson & Son, 32, South Avenue.

Carlisle.—Alterations to juvenile employment offices, Portland Square, for the E.C.; city architect, 18, Fisher Street, Carlisle.

Chelmsford.—Ward blocks, for Chelmsford and Essex Hospital governors; Pertwee and Howard, architects, The Institute, London Road.

Cheltenham.—Houses, Shurdington estate; H. O. Hawkins. Church, Chandos Street, Winchcomb; Lord Bishop of Clifton.

Clacton-on-Sea.—Depôt, St. Mary's School; Essex county architect, Chelmsford.

Coventry.—Houses, Canley, Radford, Scott's Lane, and Stoke Aldermoor; A. F. Underhill, director of housing, The Council House.

Crewe.—Houses in Pym's Lane, for G. Blease, builder, Henry Street Saw Mills, Crewe.

Crosby.—Council school, Forefield Lane; Quiggin and Gee, architects, North House, 17, North John Street, Liverpool.

Derwent. — Houses, Newland Park Avenue; Newland Park Estate Co.

Dover. — Rebuilding King's Hall Cinema, Biggin Street, for Keystone Cinemas, Ltd.; Hall, Beddall & Co., Ltd., contractors, Waterloo Bridge, London, S.E.1.

Dundee.—Factory, Bellfield Street; Urquhart Lindsay and Robertson Orchar, Ltd.

Dunston-on-Tyne.—School, for Durham County E.C.; county architect, 34, Old Elvet, Durham.

Ealing.—Business premises, The Broadway, for Montague Burton, Ltd., Hudson Road Mills, Leeds.

Eire.—(DUBLIN).—Houses (497), Crumlin estate, for T.C.; P. F. Fearon & Co., builders.

Enfield.—Flats (44), Westfield Park, for U.D.C.; Highgate Builders, Ltd., 15, Lyttleton Road, London, N.2.

Finchley.—Flats, Torrington Park; A. R. Pilgrim, builder, Parcian, Oakleigh Avenue, London, N.20. Houses, East End Road; Comben & Wakeling, Ltd., builders, 603, Kenton Road, Kenton, Harrow, Middlesex. Extensions to factory, Oak Lane, N.2, for Simms Motor Units, Ltd.; Walter Bryan, chief engineer. Houses, Temple Fortune estate, Norfolk Gardens; G. Reed & Sons, Ltd., Temple Fortune estate, Falloden Way, London, N.W.1.

Flaxton (YORKS).—Estate development, Stockton Lane; B. Shaw.

Glasgow.—Extension of mortuary and pathological department at the Southern General Hospital (£14,000); city architect. Church, Seres Road, Clarkston; Baptist Union of Scotland. Extensions, Temple Park works; J. & J. Neil, Ltd. Cinema, Dumbarton Road, Partick; Odeon, Ltd. Lighting control station (£19,000); city engineer. Church, Pollok area; R.C. Authorities. Houses, Petershill Road and Crighton Road; housing director. Reconstruction, St. Rollox refuse works; Leitch & Sharp, consulting engineers. Annexe, Gartloch Hospital; city engineer.

Grays (ESSEX).—Cinema, Quarry Hill, for L. Morris; B. E. Conlin, contractor, Martin Road, Bridlington.

Hagley (WORCESTERSHIRE).—R.C. senior school; Sandy & Norris, architects, 134, Newport Road, Stafford.

Halesowen.—Alterations and additions to premises for Barclay's Bank, Ltd., 54, Lombard Street, London, E.C.3; Peacock & Bewlay, architects, 83, Colmore Row, Birmingham.

Harrow.—Fire station, for U.D.C.; W. G. Taylor, contractor, 368, Northolt Road, Harrow.

Hereford.—Houses, Cumbrae Avenue; G. C. Rowe. Depository, Widemarsh Street; Pickfords, Ltd. House, shop and bakery, St. Martin's Street; Watts & Bolt.

Hertfordshire.—School, St. Albans, for C.C.; Ringmer Building Works, Ltd., Ringmer, Lewes, Sussex.

Jarrow-on-Tyne.—Fire station at Monkton; borough engineer.

Lancashire.—Police headquarters and training depôt, for Lancs Constabulary; Standing Joint Committee, County Offices, Preston. Catholic schools, Ince-in-Makerfield and Colne; county architect, Preston.

Lancaster.—New ward block for maternity department, Royal Lancaster Infirmary; A. O. Thoms, contractors, Wheatfield.

Leatherhead.—Depôt, workshops, garages, stores, &c., for U.D.C.; J. L. Davies, surveyor, Council Offices.

Lindsey.—School, Boston Road, Horncastle, for C.C.; county architect, County Offices, Newland, Lincoln.

Liverpool.—Garage building, for Ribble Motor Services, Ltd., Frenchwood Avenue, Preston; C. D. Quinn, architect, Ribble Motor Services, Ltd., Frenchwood Avenue, Preston. Works for Gee Manufacturing Co., Ltd.; R. Costain & Sons, Ltd., contractors, Barlows Lane, Fazackerley.

London.—(POPLAR). — Redevelopment, 2114, Trellis Street; Andrews & Gale, architects, 135, Bow Road, E.3. (BRIXTON).—Cinema, shops an flats, 344-364, Brixton Road, for General Theatre Corporation, Ltd.; McLaughlin and Harvey, Ltd., contractors, 24, Highbury Grove, N.5. (CHELSEA).—Flats (92), Onslow Dwellings Area, for B.C.; E. W. Armstrong, architect, 19, Hobart Place, Eaton Square, S.W.1.

Macclesfield. — Houses, Whiteburn Road and Artist's Lane, Nether Alderley, for I. Massey & Sons, Ltd., builders, Alderley Edge, Manchester.

Manchester.—Shops, Brownley Green estate; housing architect. Additions to St. Joseph's Hospital, Whalley Range; governors.

Middlesbrough.—Alterations to premises in Grange Road for Watson & Coates, Ltd., Kitching & Co., architects, 21, Albert Road, Middlesbrough. Houses Preen Drive; J. Old, builder, Preen Drive.

Milnrow.—Houses in Harbour Lane for Eric Cockin, builder, 8, Cornley Grove, Grotton, Oldham; J. R. Butterworth, architect, 1, Bertha Street, Shaw Oldham.

Milnthorpe.—Extensions to milk canning factory, for Libby, McNeill and Libby; Halstead Best, architect, 20, Clifton Street, Blackpool.

Morecambe.—Houses, Norland Avenue; Faithope Estates, Ltd. Shops and flats, Marine Road; Winter Gardens, Ltd.

Morpeth.—Alterations to Longhirst Hall; C. S. Errington, architect, 46, Grainger Street, Newcastle-on-Tyne.

Newbury. — Baptist church; A. J. Chivers, builder, 63, Cheap Street, Burbury.

Newcastle-on-Tyne.—R. C. elementary school; Rev. J. Marshall, The Presbytery, Stamfordham Road, Newcastle.

Northampton. — Development, Rushmere estate; A. Glenn & Sons, Ltd. Development, Millway estate, Duston; H. Stanford.

Portland.—Houses, Bloomfield Terrace; L. S. Lynham.

Prescot.—R. C. church; F. & J. Noonan, builders, 357, Crow Lane West, Earlestown, Newton-le-Willows, Lancs.

Reigate.—Orphanage, Duxhurst, for Alexandra Orphanage; Gelder & Kitchen, architects, Alfred Gelder Street, Hull.

Salisbury. — Extensions to hospital; Salisbury & Joint District Isolation Board.

Sheffield.—Schools, Chesterfield Road, Norton and Bradway, for E.C.; city surveyor. Houses, Highcliffe Drive and High Storrs Road, Sheffield; Ackroyd & Abbott, builders, 61, Studley Road, Attercliffe.

Skelmersdale.—Block of houses in Sherratt Street for Wright and Todd, 178, Sussex Road, Southport.

Slough.—New hospital; H. H. Clark, architect, 235, Magdalen Road, London, S.W. Extensions to works for Rheostatic Co., Ltd.

Southport.—Extensions to factory for Brockhouse Engineering Co.

South Shields.—Cinema in Ocean Road; Morton & Son, architects, Martin's Bank Chambers, South Shields. Houses at the Meadowlaws; Peel and Clouston, builders, Tyne Dock, South Shields. Houses, Kelvin Grove; G. R. Smith & Partners, architects, 3, Winchester Street, South Shields. Warehouse, offices and workshop, Nile Street for A. E. Evans; H. Hill, architect, 10, Winchester Street, South Shields. Houses on the Horsley Hill estate for Col. Chapman; G. R. Smith & Partners, architects, 3, Winchester Street, South Shields. Mortuary, for the T.C.; G. Bailey, Ltd., builders, King Street, South Shields.

St. Albans.—Reconstruction of Grand Palace Cinema, for Eastern Cinemas, Ltd.; H. C. Janes, Ltd., contractors, Luton. Fire stations for R.D.C.; surveyor.

Stanley (Co. DURHAM).—Fire station for U.D.C.; A. Routledge, surveyor, Council offices, Stanley.

Stanmore.—Houses (40), Eaton Close, Denis Lane; G. Wimpey & Co., 27, The Grove, Hammersmith.

Stockport.—Shops and houses, Stockport Road, Cheadle Heath; A. Allen (Builder), Ltd., Heath Park Estate.

Stroud.—Extensions to factory for Sperry Gyroscope Co.; Stratton, Davis & Yates, architects, 12, Queen Street, Gloucester.

Surbiton.—Factory for Siebe Gorman & Co., Ltd.; G. Parker & Sons, Ltd., builders, 124, Sumner Road, S.E.15.

Surrey.—Court house, Shotfield, Wallington, for C.C.; Robert Atkinson, architect, 13, Manchester Square, London, W.1.

Tunbridge Wells.—Depôt, shops and flats for Carter Paterson & Co., Ltd.; Tersons, Ltd., contractors, 128, Goswell Road, London, E.C.1.

Twickenham. — Flats (26), Constance Road, Whitton; G. P. Townsend, architect, The Quadrant, Richmond-on-Thames.

Tyldesley. — Store premises, Astley Street estate; Tyldesley and District Industrial Co-operative Society, Ltd.

Tynemouth.—Fire station for the T.C.; borough engineer.

Warrington.—Catholic school at Bewsey; E. F. Massey, architect, 27, Bold Street.

Wellingborough. — Houses, Queensway; F. Ireson & Son, builders, Park Road.

West Sussex.—School, East Preston, Worthing, for E.C.; county architect, County Hall, Chichester.

Weymouth (DORSET).—Church, Spa Road, for Ecclesiastical Commissioners; R. Fry, builder, Kingsbury Episcopi, Somerset.

Whitley Bay. — Houses, Madeira Avenue; A. G. Howe, builder, St. Mary's Avenue, Whitley Bay. Houses, Woodleigh Road and Cauldwell Avenue; Dixon & Bell, architects, Pearl Buildings, Newcastle-on-Tyne.

Wombwell.—Houses and bungalows, Wood Walk; A. Dobson, Station Road, Wombwell, near Barnsley.

York.—Senior school, Acomb; Penty & Thomson, architects.